



The Splendid Cooperation with the Bodies That Had Their Inception within the American Pharmaceutical Association and Continue to Hold Their Meetings with the Parent Organization Speaks for Their Common Interests

Vol XXII, No 7

JULY, 1933

# JOURNAL

## OF THE

# AMERICAN

# PHARMACEUTICAL

# ASSOCIATION

TRADE MARK

### CONTENTS

The Pharmacy Exhibit—A Century of Progress, International Exposition	193
Editorial	
Ratification of the Narcotics Limitation Convention	596
Progressive Thoughts on Cooperation	597
Scientific Section	
Studies on the Bioassay of Digitalis—Frog Methods—Defendorf	599
A Chemical Examination of the Oil of Ergot—Liero	608
A Chemical Study of Ma Huang—Hayden and Jordan	616
The Assay of Preparations Containing Pepsin Official in the National Formulary—Jenkins and Joshi	627
The Pharmacological Action of Peimine and Peiminine—Chen, Chen and Chou	638
Studies in Percolation—Wrubel	641
Bibliography of Pharmaceutical Research—DuMer	649
Assay of Glycerite of Bismuth—Mayer	653
Determination of Specific Gravity of Paraffin—Alstedt	653
A Study of Vehicles for Medicines—Fantus, Dyniewicz and Dyniewicz	654
The Department of American Association of Colleges of Pharmacy	
American Association of Colleges of Pharmacy—Thirty-Fourth Annual Meeting	659
Association Business	662
Committee Reports	
The Pharmaceutical Aspects of Socialized Medicine—Army, Ph.D.	665
The Professional Pharmacy—Delgado and Kimball	671
Editorial Notes	694
Personal and News Items	695
Societies and Colleges	696
Officers of State Pharmaceutical Associations	698
Legal and Legislative	702
Book Notices and Reviews	703
Advertising—Cover Pages 2, 3 and 4 and pp. 1-1111	

Published Monthly by the American Pharmaceutical Association. Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase St., Baltimore, Md.  
Annual Subscription, \$4.00. Canada, \$4.35. Other Foreign, \$4.50. Single Numbers, 35 cents. Canada, 40 cents. Other Foreign, 50 cents.

THE 51st ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN MADISON, WISCONSIN, AUGUST 28 TO SEPTEMBER 2, 1933, HOTEL LORRAINE, HEADQUARTERS, EMERSON STANLEY, 602 CENTRAL BUILDING, MADISON, LOCAL SECRETARY

The 1933 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Madison.

Entered second-class Matter January 23, 1917 at the Post Office at Easton, Pa. under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917 authorized July 1, 1933.



Madison Is the Convention City from August 21st-September 2nd  
 Plant Science Seminar, August 21st-25th National Conference  
 of Pharmaceutical Research, August 26th American  
 Association of Colleges of Pharmacy and National  
 Association of Boards of Pharmacy, August  
 28th and 29th Other Divisions from  
 August 29th-September 2nd

Vol XXII, No 8

AUGUST, 1933

# JOURNAL

## OF THE

# AMERICAN

# PHARMACEUTICAL

# ASSOCIATION

TRADE MARK

### CONTENTS

Frontispiece and Sketch—Edward Stabler	707
Editorial	
The Phoenix as an NRA Emblem	708
Interpreting the Codes	709
The Madison Meeting of the American Pharmaceutical Association	709
Scientific Section	
The Relation of Some Physical Properties to Bactericidal Action of Some $\alpha$ -Phenylsubstituted Acids—Haldinger and Nicușor	711
The Constituents of Wu Chü Yü ( <i>Urodia Antacarpa</i> )—Chen and Chen	716
Chemical Study of Two Chinese Drugs—Ling and Lin	720
Therapeutic Substances Derived from Unsymmetrical Diphenyl Compounds I—Harris and Christensen	723
A Comparative Study of the Stability of Emulsions with Variation in the Proportion of Ingredients—Lauzevin	728
The Extraction and Assay of Crude Ergot—Thompson ( <i>Concluded</i> )	736
Pharmacopoeial Exhibit at the A. M. A. Convention	741
The National Formulary Exhibit at the American Medical Association Convention	746
Plant Science Seminar	747
Bibliography of Pharmaceutical Research—DuNiz	748
A Study of Vehicles for Medicines—Lantus, Dyniewicz and Dyniewicz ( <i>Concluded</i> )	751
Determination of the Reasonable or Permissible Margin of Error in Dispensing—Andrews	751
The Professional Pharmacy—Delgado and Kimbrell ( <i>Continued</i> )	764
Digitalis in Pharmacy	782
The Department of the National Association of Boards of Pharmacy	
Program of Thirtieth Annual Convention	783
Committee Reports	
Report of Sub-Committee on Digestive Ferments and Glandular Products	784
Determination of Taurocholic Acid in Bile Salts—Wilson	788
Association Business	
Proceedings of the Local Branches	791
Report of Meeting of Maryland Pharmaceutical and Baltimore Retail Druggists Association	794
Hours and Wages for Retail Druggists	796
Editorial Notes	797
Personal and News Items	799
Obituary	800
Societies and Colleges	801
Officers of State Pharmaceutical Associations	801
Publications Received	801
Advertising—Cover Pages 2, 3 and 4 and pp. I-XXIV	804

Published Monthly by the American Pharmaceutical Association. Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase St., Baltimore, Md.  
 Annual Subscription, \$4.00, Canada, \$4.35, Other Foreign, \$4.50. Single Numbers, 35 cents, Canada, 40 cents, Other Foreign, 50 cents.

THE 81st ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION  
 WILL BE HELD IN MADISON, WISCONSIN, AUGUST 28 TO SEPTEMBER 2, 1933, HOTEL  
 LORRAINE, HEADQUARTERS, EMERSON STANLEY, 602 CENTRAL BUILDING,  
 MADISON, LOCAL SECRETARY

The 1933 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar  
 will also be held in Madison

Entered as second class Matter January 23 1917 at the Post Office at Easton Pa. under the Act of March 3 1879.  
 Acceptance for mailing at special rate of postage provided for in section 1103 Act of October 3 1917 authorized July 10 1918



# GASTRON

A complete gastric gland extract, in a  
potent agreeable solution

Supplied in 6 oz and 32 oz Bottles

## GASTRON *with* IRON

Supplied in 6 oz Bottles Only

FAIRCHILD BROS. & FOSTER  
New York

## MALLINCKRODT NEW BISMUTH SUBCARBONATE

**Permanently Pure White**

*Direct Sunlight Does Not Discolor It*

A real advantage when used in pharmaceutical and cosmetic products. Also bulky and more than meets the U.S.P. requirements having a constant composition of true Bismuth Subcarbonate  $(\text{BiO})_2 \text{CO}_2$ .

From every standpoint it is the best Bismuth Subcarbonate on the market.

**Bismuth Subnitrate U.S.P. Mallinckrodt**

Exceptionally white and devoid of free acid which prevents the development of strong acid odor on storage.

**Bismuth Subsalicylate U.S.P. Mallinckrodt**

Also an unusually white product available in two forms—one almost twice as bulky as the regular kind. Bulkiness gives greater covering power and better suspension properties in water and alcohol.

*Mallinckrodt*

CHEMICAL WORKS



Over 1500 Fine Chemicals for  
the Prescription Druggist

ST. LOUIS

MONTREAL

NEW YORK

Pharmacy Week Will Be Held during the Week of October 9-14, 1933  
Let the Windows Show Professional Service

Vol XXII, No 9

SEPTEMBER, 1933

# JOURNAL

## OF THE

# AMERICAN

# PHARMACEUTICAL

# ASSOCIATION

TRADE MARK

### CONTENTS

Frontispiece and Sketch—Howard Kramers	807
Editorial	
Pharmacy Week	809
Tell about Your Service and about Your Wares but Not in the Same Message	810
Completion of Retailers' Code Delayed	810
The Eighty-First Annual Meeting of the A. Ph. A.	811
Scientific Section	
The Pharmacological Action of Ten Amines Related to Ephedrine and Tryptamine—Chen and Chen	813
Phytochemical Notes—Crithm	819
Washington Belladonna and Methods of Assay—L. V. and Goodrich	824
A Phytochemical Investigation of the Oleoresin of <i>Pinus Monticola</i> Dougl.—Foot and Mirov	828
Bibliography of Pharmaceutical Research—Du Mez	831
Determination of the Reasonable or Permissible Margin of Error in Dispensing—Andrews (Continued)	838
Syrup of Tolu—Fick	844
Address of the President of the American Pharmaceutical Association—Philip	841
Address of the Chairman of the House of Delegates—Slocum	861
Address of the President of the American Association of Colleges of Pharmacy—Stocking	861
Address of the President of the National Association of Boards of Pharmacy—Allan	873
Resolutions and Recommendations Adopted by the American Pharmaceutical Association at Its Eighty-First Annual Meeting at Madison, Wisconsin, August 28-September 2, 1933, upon Recommendation of the House of Delegates through Its Committee on Resolutions	879
The Professional Pharmacy—Delgado and Kimball (Continued)	883
Association Business	902
Report of the Fairchild Scholarship Examination	920
Abstracts of Papers Presented before Scientific Section, American Pharmaceutical Association, Madison Meeting, 1933	922
Pharmacy Week National Window Contest—Hofstad, Jr.	922
Editorial Notes	924
Obituary	925
Personal and News Items	926
Societies and Colleges	927
List of Registrants Annual Meeting A. Ph. A. Madison Wis.	927
State Association Meetings	929
Book Notices and Reviews	930
Advertising—Cover Pages 2, 3 and 4 and pp. I-XXII	

Published Monthly by the American Pharmaceutical Association. Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase St., Baltimore, Md.  
Annual Subscription, \$4 00, Canada, \$4 35, Other Foreign, \$4 50, Single Numbers, 35 cents, Canada, 40 cents, Other Foreign, 50 cents

THE 82nd ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION  
WILL BE HELD IN WASHINGTON, D. C.

The 1934 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Washington

Johns Hopkins University School

Entered as second-class matter January 23, 1917 at the Post Office at Easton, Pa. under the Act of March 3, 1879  
Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917 authorized July 10, 1918

# GASTRON

A complete gastric gland extract, in a  
potent agreeable solution

Supplied in 6 oz and 32 oz Bottles

## GASTRON *with* IRON

Supplied in 6 oz Bottles Only

**FAIRCHILD BROS. & FOSTER**  
New York

### FIVE GOOD REASONS FOR ATTENDING THE COLLEGE OF PHARMACY OF THE CITY OF NEW YORK COLUMBIA UNIVERSITY

- 1 It is an integral part of Columbia University, one of the world's great institutions of learning
- 2 It has a record of 103 years of devoted service to Pharmacy and is the *alma mater* of thousands of distinguished pharmacists
- 3 While old in years, it has always been in the forefront of pharmaceutical progress. It was the first school in New York State to institute the course in Pharmacy. It was the first school in New York to offer a graduate course in Pharmacy leading to the degree of Doctor of Pharmacy.
- 4 It has a distinguished faculty including former presidents of national and state associations, Remington, Hanbury and Ebert medalists, and holders of the Ph D, M D, M A, A B and B S degrees.
- 5 Its degree of B S in Pharmacy is recognized by the Boards of Pharmacy of practically every state in the Union. Its graduates are found practicing throughout the length and breadth of this country.

Mr W B Simpson, Registrar  
The College of Pharmacy of the City of New York  
113-119 West 68th Street New York, N Y

A Ph A

I want to learn more about the profession of Pharmacy

Name

Address

" Springing Originally from Magic and Superstition, and Surviving the Influence of Alchemy, Modern Pharmacy Has Come to Be a Specialized Calling That Has Reached the Dignity of a True Profession "—*From the Pharmacy Week Message of President Franklin D. Roosevelt*

Vol XXII, No 10

OCTOBER, 1933

# JOURNAL

## OF THE

# AMERICAN

# PHARMACEUTICAL

# ASSOCIATION

TRADE MARK

### CONTENTS

Frontispiece and Sketch—Robert L. Swain	933
Editorial	
Completion of the Headquarters Building	935
The President's Responsibility and Yours	936
Crawford W. Long, Physician-Pharmacist Discoverer of Ether Anesthesia	937
Scientific Section	
Fluidextract of Ergot—Rowe and Seaville	938
The Standardization of Ergot—Stevens	940
Lactucaria I The Mydriatic Activity of Lactucaria by the Munch Method—Munch, Pratt and Myers	943
The Gravimetric and Volumetric Determination of Antipyrine as Hydroferrocyanide in the Presence of Amidopyrine—Kollthoff	947
Piperazine Derivatives as Local Anesthetics—Braker and Christiansen	950
A Modified Assay Process for Alkali Benzoates and Salicylates—Schmidt and Krantz Jr	953
The "Co Fe Cu" Fluids and Certain Pharmacopœial Tests—Arny and Taub	956
Bibliography of Pharmaceutical Research—Dunlap	962
An Assay Method for Fluidextract of Ipecac U. S. P.—Bye, Schoetzow, Harrison and Seif	965
Miscible Fluidextract of Ipecac—Reese and Crockett	968
Difficult Prescriptions—Luscomb, Phar. D.	970
The Accuracy of Medicine Droppers with Flared Tips—Husa and Husa	975
The Department of American Association of Colleges of Pharmacy	
Summary of the Proceedings of the 1933 Meeting of the American Association of Colleges of Pharmacy	977
The Professional Pharmacy—Delgado and Kimball (Concluded)	983
Proceedings of the Local Branches	100
Remington Medal Presentation Honoring Evander F. Kelly	1006
The Eighty-First Annual Meeting of the American Pharmaceutical Association, Madison, Wis. August 28-September 2, 1933	1008
House of Delegates American Pharmaceutical Association	1029
Association Business	1058
Editorial Notes	1066
Societies and Colleges	1068
Obituary	1069
Industrial Recovery Act	1071
Advertising—Cover Pages 2, 3 and 4 and pp. I-XXII	

Published Monthly by the American Pharmaceutical Association. Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase St., Baltimore, Md.  
Annual Subscription, \$4.00, Canada, \$4.35, Other Foreign, \$4.50, Single Numbers, 35 cents, Canada, 40 cents, Other Foreign, 50 cents

THE 82nd ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN WASHINGTON, D. C.

The 1934 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar will also be held in Washington

Entered as second-class matter January 23, 1917 at the Post Office at Easton, Pa. under the Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in section 1103 Act of October 3, 1917 authorized July 10, 1918

DEPARTMENT OF PHARMACOLOGY  
Johns Hopkins Medical School

# GASTRON

A complete gastric gland extract, in a  
potent agreeable solution

Supplied in 6 oz and 32 oz Bottles

## GASTRON *with* IRON

Supplied in 6 oz Bottles Only

**FAIRCHILD BROS. & FOSTER**  
New York



TABLETS FOR ORAL  
USE—BOTTLES OF  
25 50 500

SOLUBLE DISCS FOR  
SOLUTIONS—BOT-  
TLES OF 50 BOXES  
OF 5 TUBES OF 10  
DISCS



POWDER FOR  
TOPICAL USE—  
BOTTLES OF 5  
GMS



# MALLOPHENE

THE MALLINCKRODT ANTISEPTIC DYE  
FOR TOPICAL AND ORAL ADMINISTRATION

A dependable agent in G U and Dental  
work, Mallophene is now being inten-  
sively advertised to physicians and den-  
tists—in publications, by mail, and at  
medical meetings

Write for literature and sample letter  
for pharmacists to mail to physicians

CHEMICAL

*Mallinckrodt*  
ST LOUIS MO

WORKS

OVER 1500 FINE CHEM-  
ICALS FOR THE PRE-  
SCRIPTION DRUGGIST

SEND FOR LIST OF MALLINCKRODT  
MOST LARGELY USED PRESCRIP-  
TION CHEMICALS...

Individuality and Responsibility Have a Value in Establishing the  
Standing of the Pharmacist in Professional Activities Pharmacy  
Is Known by Its Service and the Pharmacist by His Personality  
and Devotion to Pharmaceutical Duties

Vol XXII, No 11

NOVEMBER, 1933

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

## CONTENTS

Frontispiece and Sketch—Patrick H. Costello	1075
Editorial	
Individuality and Responsibility	1076
Plans for Increasing the Membership in the A. Ph. A.	1077
Scientific Section	
Quantitative Applications of the Modified Türk Test—Munch, Pratt and de Poncc	1078
Medicinal Cod Liver Oil—Observations on Color and Viscosity—Frac	1080
Cod Liver Oil—Stability of Vitamin A Content under Conditions of Commercial Distribution—Law	1082
Tincture of Digitalis—Rowe and Scoville	1087
The Germicidal Action of 2-Chloro-4-n-Alkylphenols—Blickle and Stockhaus	1090
Some Facts Concerning the Pharmacological and Physiological Action of Acetanilid—Helms, M. D.	1093
The Chemical and Pharmacological Properties of Calcium Acetylsalicylate—Thompson and Dringstedt	1096
Color Standards for Cod Liver Oil—Holmes and Tripp	1102
Bibliography of Pharmaceutical Research—DuMec	1110
Amaranth as a Substitute for Cudbear with Improved Methods in the Preparation of Some N. F. Galenicals—Morrison	1112
Some Useful Prescriptions for the Dental Profession—Nickelsen	1115
An Historical Note on the Official Rosin Cerates—England, Ph. M.	1119
Binding Up a Wound—Kilmer	1122
Gifts of the Gods to Primitive Man—Lloyd	1126
An Opportunity and a Challenge to Pharmacy Educators—Goeckel	1130
The Department of the American Association of Colleges of Pharmacy	
Why Organic Chemistry Should Be Taught in the School of Pharmacy—Klemme	1134
What the Department of Pharmacy Expects of the Department of Chemistry—Newton	1136
The Relationship of Prescription Incompatibilities to Pharmacy—Richards	1139
Superstition, Credulity and Skepticism—Whitebread	1140
Proceedings of the Local Branches	1146
Publications Received	1154
Committee Reports	
Report of Legislative Committee A. Ph. A.	1155
Report of the Chairman of the Pharmaceutical Syllabus Committee—Beard	1157
The Sections of the American Pharmaceutical Association	1161
Editorial Notes	1199
Personal and News Items	1200
Obituary	1201
Societies and Colleges	1202
Legal and Legislative	1204
Book Notices and Reviews	1205
Advertising—Cover Pages 2, 3 and 4 and pp. 1-11	

Published Monthly by the American Pharmaceutical Association. Office of publication, 20th & Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase St., Baltimore, Md.  
Annual Subscription, \$4.00, Canada, \$4.35; Other Foreign, \$4.50, Single  
Numbers, 35 cents, Canada, 40 cents, Other Foreign, 50 cents

THE 82nd ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION  
WILL BE HELD IN WASHINGTON, D. C.

The 1934 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Officials and the Plant Science Seminar  
will also be held in Washington

Entered as second-class matter January 23, 1917 at the Post Office at Easton, Pa. under the Act of March 3, 1879.  
Acceptance for mailing at special rate of postage provided for in section 1103, Act of October 3, 1917 authorized July 10, 1918.

# GASTRON

A complete gastric gland extract, in a  
potent agreeable solution

Supplied in 6 oz and 32 oz Bottles

## GASTRON *with* IRON

Supplied in 6 oz Bottles Only

FAIRCHILD BROS. & FOSTER  
New York

### APPLICATION FOR MEMBERSHIP IN THE

## American Pharmaceutical Association

Approving the objects of the American Pharmaceutical Association, I hereby apply for membership in the Association and subscribe for the "Journal of the American Pharmaceutical Association," and enclose \$5 00 as annual membership dues, \$4 00 of which is for a year's subscription to the Journal

Name in Full \_\_\_\_\_  
(Write or print name in full—Initials are not sufficient)

Number and Street \_\_\_\_\_

Date \_\_\_\_\_ Town \_\_\_\_\_ State \_\_\_\_\_

Paid \$ \_\_\_\_\_ No \_\_\_\_\_

This application with the first year's payment of \$5 00 may be sent to the Chairman of the Membership Committee the Secretary or any officer of the A Ph A

E F KELLY, Secretary,  
10 West Chase Street,  
Baltimore, Md

After January 1, 1934, the American Pharmaceutical Association Will  
Occupy the Headquarters Building, Constitution Ave and 22nd Street,  
N W, Washington, D C This Step Marks the Beginning of a  
New Era in the History of the Organization

Vol XXII, No 12

DECEMBER, 1933

# JOURNAL

## OF THE

# AMERICAN

# PHARMACEUTICAL

# ASSOCIATION

TRADE MARK  
CONTENTS

Frontispiece and Sketch—J. Lester Hoffman	1209
Editorial	1210
The Season's Greetings	1210
Food, Drug and Cosmetic Legislation	1210
Studies in Professional Accuracy	1211
Looking Backward and Thinking Forward	1213
Scientific Section	
A New Field of Investigation in Pharmacognosy: The Microscopy of Glandular Products— Vonnack and Reed	1211
Notes on the Water of Crystallization of Quinine Sulphate—Bical and Szalkowski	1219
The Detection of Small Quantities of Carbon Monoxide in Medicinal Oxygen—Schmidt and Krantz Jr	1222
Licorice Fern and Wild Licorice as Substitutes for Licorice—Fischer and Lynn	1223
The Pigeon as a Hematopoietic Test Animal—Peabody and Neale	1231
A Method for the Determination of Minute Amounts of Aldehydes in Ether—Carey Green and Schoetzow	1237
Qualitative Tests for Ephedrine and Its Derivatives—Feng and Read	1241
A Note on the Water Content of Magnesium Oxide—Schmidt and Krantz Jr	1245
Coöperation between Physicians and Pharmacists of the Northwest—Bender	1246
Bibliography of Pharmaceutical Research—DuVez	1247
The Identification of Some Hypnotics of the Barbituric Acid Series—Hargreaves and Nixon	1250
A Practical Enteric Coating for the Retail Pharmacist—Buley and Rhodes	1253
A Proposed Formula for Belladonna Ointment—Lee and Hoch	1255
Prescription Accuracy as Shown by State Board of Pharmacy Examinations—A Preliminary Study—Swain	1259
Binding Up a Wound—Kilmer (Concluded)	1262
Publicity and the Pharmacist—Garvin	1265
The Department of the American Association of Colleges of Pharmacy Introductory Lecture to a Course in History of Pharmacy—Kremers	1270
Symposium on Practicing Professional Pharmacy	
The Foundations of Success for Professional Pharmacy—Cook	1279
The Hospital Formulary—Hatcher and Stainsby	1281
Pharmacology in the Medical Curriculum and the United States Pharmacopœia—Krantz Jr	1282
The Sections of the American Pharmaceutical Association	1284
The Growth of Professional Pharmacy—Jordan	1295
Proceedings of the Local Branches	1296
Association Business	1302
Marketing Prescription Department Items—Delgado	1304
Editorial Notes	1306
Obituary	1308
Book Notices and Reviews	1310
Index	111
Advertising—Cover Pages 2, 3 and 4 and pp 1-XXII	

Published Monthly by the American Pharmaceutical Association: Office of publication, 20th  
& Northampton Sts., Easton, Pa. Editorial Office, 10 West Chase St., Baltimore, Md.  
Annual Subscription, \$4 00, Canada, \$4 35, Other Foreign, \$4 50; Single  
Numbers, 35 cents, Canada, 40 cents; Other Foreign, 50 cents

THE 82nd ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION  
WILL BE HELD IN WASHINGTON, D C

The 1934 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conference of Pharmaceutical Association Secretaries, of the Pharmaceutical Law Enforcement Official, and the Plant Science Seminar  
will also be held in Washington

Entered as second-class Matter January 23 1917 at the Post Office at Easton Pa. under the Act of March 3 1879  
Acceptance for mailing at special rate of postage provided for in section 1103 Act of October 3 1917 authorized July 10 1918



# GASTRON

A complete gastric gland extract, in a  
potent agreeable solution

Supplied in 6 oz and 32 oz Bottles

## GASTRON *with* IRON

Supplied in 6 oz Bottles Only

FAIRCHILD BROS. & FOSTER  
New York



BACKED BY OVER 66 YEARS OF  
MANUFACTURING EXPERIENCE

## THE LABEL PROTECTS the Quality of your Prescriptions

Every item manufactured under the Mallinckrodt  
Label is checked and rechecked

They must meet all official requirements or bet-  
ter Mallinckrodt quality established by over  
66 years of manufacturing experience

Insist on the Mallinckrodt signature on your fine  
prescription chemicals Order them in the origi-  
nal Mallinckrodt shelf bottles The first of their  
kind—the most convenient and economical in  
use

Send for latest price list of the Famous 84  
most largely used prescription items and full  
description of the new uniform sized shelf bottle  
in which they are packed

*Mallinckrodt*  
**CHEMICAL WORKS**

2nd & Mallinckrodt Sts, St Louis Mo

Over 1500 Fine Chemicals for  
the Prescription Druggist

ST LOUIS • MONTREAL • NEW YORK

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXII

JULY, 1933

No 7

## THE PHARMACY EXHIBIT—A CENTURY OF PROGRESS INTERNATIONAL EXPOSITION

PHARMACISTS will have pride in the pharmacy exhibit at the World's Fair, in Chicago, and be greatly pleased with the impression made on the visitors. The exhibit reflects credit on pharmacy and brings its message to the public in a way never before possible, and the displays of other branches of the medical sciences and public health activities, together with those of the divisions of related industries, complement and supplement each other in a most interesting and informative portrayal of pharmacy and its service.

Chairman H. C. Christensen and Secretary Frank B. Kirby have made it possible for the writer to acquaint the readers with the exhibit by illustrations and descriptions. The pillars make it difficult, if not impossible, to present complete details in one picture, hence several views are shown, and the explanatory descriptions supplied by Chairman Christensen enable the writer to describe the exhibits in more or less detail. The photographs were made by Kaufmann-Fabry—the official photographer—mention here serves the purpose of the usual courtesy line under each photograph.

A glass case on the central dais contains a reproduction from the "Ebers Papyrus." The display recesses at both ends of the picture are only partially visible on account of the obstruction by the pillars. Left to right, in recess No. 1, a double space, the story of Cinchona is depicted—there are four colored drawings of the plant but only part of one drawing is visible in the photograph, the drawings form the background of the display, showing branches, leaves and seed pods. Several jars and one large package of cinchona bark are included in the display, two of these were exhibited at the 1893 Fair in Chicago. At the left, not visible in the picture, is an illuminated map showing the countries in which cinchona is native, where it is cultivated and where malaria was very prevalent. Cards call attention to the medicinal use of the bark and its preparations, the alkaloidal discoveries and the value of this important drug to the world.



Detailed view of the Historical Rotunda The inscription above is from  
Ecclesiasticus 38 4 6



Detailed view of the first drug store in Chicago (Philo Carpenter) A modern pharmaceutical and chemical laboratory Digitalis display

A complete line of U S P and N F preparations is shown in Recess No 2 and attention is called to progressive improvements in their manufacture and standardization, resulting in more elegant and efficient preparations. The art and science of pharmacy are contrasted and importance of accuracy and uniformity stressed.

The compounds and preparations of iodine are featured in Recess No 3. The next display (double space) shows preparations compounded in accordance with the first pharmacopœia published in the United States, that of the military hospital established by General George Washington at Lititz, Pa., and compiled by Dr. William Brown (see *JOURNAL OF PHARMACY*, October 1930, page 1041). This represents the first attempt in the United States to establish uniformity in pharmaceutical preparations and in that sense may be termed the forerunner—of the U S Pharmacopœia, established by Lyman Spalding—of the National Formulary, and of the "Recipe Book." The value of standardization is brought to the attention of the visitors.

The next displays show the evolution of pharmaceutical journals and of pharmaceutical textbooks. Recess No 7, another double section, is devoted to the AMERICAN PHARMACEUTICAL ASSOCIATION, above is a photo mural depicting the American Institute of Pharmacy and the "ground breaking ceremony," in the center is a mural of the building in Philadelphia where, in 1852, the ASSOCIATION was organized. Bound and unbound JOURNALS, PROCEEDINGS and YEAR BOOKS are shown.

Photograph No 4 shows a reproduction of Chicago's first drug store, that of Philo Carpenter, one of the city's outstanding citizens of that period. Items of historical and pharmaceutical significance are included in this division, also a modern pharmaceutical and chemical laboratory where, daily, instructors and students and graduates of nearby colleges of pharmacy give demonstrations. At the right is a "digitalis display," telling the story of this important drug, from farm to pharmacy, oil paintings, photographs and cards tell its story and that of Old Lady Shropshire and Dr. Withering.

Group 5 includes the educational and public health displays. The revolving globes with maps give statistics on the number of colleges of pharmacy and the number of drug stores, and in the photo mural background the educational institutions of the earlier and present period are contrasted. The materia medica display gives to the public information as to the development of drugs employed in medicine—of the changes and progress during the century. This section also tells the story of legislation and related statistics. Chairman Christensen and Miss Barney are shown in the picture—See end of last page of "Bibliography of Pharmaceutical Research."

It is hoped, later, to present other views in which details will be brought out that were not caught by the camera in these photographs.

#### FERRETS SUSCEPTIBLE TO INFLUENZA

The *Lancet* reports the discovery by Drs. Wilson Smith, C. H. Andrewes and P. P. Laidlaw of the National Institute for Medical Research, that ferrets are susceptible to influenza. Heretofore it had been impossible to infect animals and the successful discovery, it is hoped, will result in finding a vaccine to combat the disease.

# EDITORIAL

E G EBERLE EDITOR

10 West Chase Street BALTIMORE MD

## RATIFICATION OF THE NARCOTICS LIMITATION CONVENTION

THE promulgation of League of Nations Narcotic Treaty became effective on July 10th and its importance was announced to the public in a radio program on July 9th, in which speakers of national prominence, including President Roosevelt, participated. The action by manufacturing and other nations is confidently expected to constitute an effective and important step in the direction of suppressing the evils of the illicit narcotic traffic and of reducing the production of narcotics to the amounts needed for medical and scientific purposes.

While "listening in," the radio program suggested this as a timely opportunity to speak briefly of pharmacy's contributions to the suppression of narcotic addiction. Long before legislation was enacted for regulating the dispensing of narcotics and preparations containing them, pharmacists studied ways and means for checking the increase of narcotic medication and resulting addiction. No group has more persistently and consistently advocated regulations for controlling the sale of narcotics to safeguard public health than have pharmacists, and officials have stated on a number of occasions that pharmacists have given the best of coöperation. It seems almost unbelievable, but nevertheless a fact, that when pharmacists first made concerted efforts to have restrictive legislation enacted, they found objection by legislators who thought there must be an ulterior motive back of their efforts, because it reduced sales volume.

Coming nearer to the time of enactment of the Harrison antinarcotic law the PROCEEDINGS of the AMERICAN PHARMACEUTICAL ASSOCIATION contain reports and papers on the subject and reference to some of them will be pardoned. On page 567 of Volume 50 of the PROCEEDINGS is the report of Chairman H. P. Hynson which gave impetus to continue the study of addiction by the ASSOCIATION. In Volume 51 is another report of the Committee (page 466) and a paper by James H. Beal—

"An Antinarcotic Law," which may be designated as a step toward national legislation relative to the handling of narcotics, for at the same meeting a draft for an antinarcotic law was submitted and a revision of it at the 1904 meeting (page 104) at which time also a paper on "Pharmaceutical Legislation with Special Reference to Antinarcotic Laws" (page 180) was presented. The report made at the 1905 meeting indicates how seriously the conditions were viewed by pharmacists throughout the country. That Congress did not realize the importance of antinarcotic legislation is evidenced by the fact that the federal law was not enacted until December 1914. The law added burdens to the many willingly assumed by pharmacists, quoting the closing paragraph of an editorial (1913) in advocating the passage of a federal antinarcotic law: "It must not be imagined that any form of law can be devised that will be entirely free from objections, or that will not impose some burdens upon pharmacists and physicians, no matter how conscientious they may be in the handling of these drugs."

"Since society began those who have been willing to deal justly with their fellow men have been compelled to bear the burden of laws intended to curb the actions of those who are not controlled by conscientious motives, and no one has yet

been able to suggest a method that will relieve the honest and conscientious citizen from this hardship."

The references made are not intended to take credit for performing a duty to mankind, but to call attention to the important services rendered by pharmacists, because they recognized their duty long before general recognition was given to the control of narcotic sales and all divisions of pharmacy entered into this service. It is contended in the interest of the public, that the sale and dispensing of all medicines be restricted to those who because of training and education know the effect of medicines and realize their individual responsibility, as professional men and women, in safeguarding the public.

The Association sponsoring the radio program spoke for uniform state anti-narcotic laws. The subject has recently (October 1932, page 989) received editorial consideration and need not be further discussed at this time. Pharmacists are awake to their responsibilities, they understand the needs and are appreciative of the support of all good citizens, they desire to assist in strengthening the federal and state laws and in making them uniform, in so far as this is possible, and will assist heartily in adequate control.

The ratification of the Narcotics Limitation Convention is an important step in suppressing the evils of illicit narcotic traffic, which has been the great source of trouble, the legalized sale may be further controlled, but at the present reflects credit upon pharmacy in its several divisions and the prescribers of medicine.

---

### PROGRESSIVE THOUGHTS ON COOPERATION

NEVER before has there been greater need of general cooperation of pharmaceutical organizations than at present. Just as state associations depend on the loyalty and support of individual membership, so also the body pharmaceutical must realize that progress is stimulated by a sense of loyalty and faith in the profession of pharmacy. The House of Delegates of the AMERICAN PHARMACEUTICAL ASSOCIATION is the forum for discussing problems of pharmacy where the associations may gain strength and understanding for meeting the situations that await improvement for their own good and of the public served by them.

At the Diamond Anniversary Meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in St. Louis, Surgeon McLaughlin, representative of the U. S. Public Health Service, said that he expected to find his greatest interest in the Scientific Section and he profited by the papers read there, but his interest was amazingly increased by attending other ASSOCIATION divisions which gave him an idea of the scope of the AMERICAN PHARMACEUTICAL ASSOCIATION, and the thing that challenged his admiration more than anything else was the evident broadening scope from a purely scientific organization, the broad statesmanship displayed in the laudable effort to bring together many divergent interests which have, however, one objective in common—the advancement of pharmacy. He considered that a most hopeful augury for the future of pharmacy in the United States and emphasized the ASSOCIATION'S opportunities and the possibilities and usefulness of bringing together the divergent interests of the drug interests and of pharmacy for exchange of ideas and working out problems of mutual benefit.

The splendid cooperation with the bodies, state associations and others, that had their inception within the AMERICAN PHARMACEUTICAL ASSOCIATION have today a growing opportunity to bring about a better service and this is made possible by the House of Delegates, the Conference of Pharmaceutical Association Secretaries, the Law Enforcement Officials and other bodies meeting concurrently and now preparing programs for the meeting to be held in Madison. These are times when as never before wise conferences and discussions will be helpful and profitable.

The last meeting held in Wisconsin by the AMERICAN PHARMACEUTICAL ASSOCIATION (1884) was presided over by the late William S. Thompson. Liberty is taken in quoting from his presidential address which may be applicable to-day: 'During the past year, pharmacists of this country have been greatly concerned in an effort to secure remunerative retail prices for what are known as proprietary medicines. The prominence which the agitation of this question has assumed, combined with its possible influence on pharmacy as a profession, renders some reference to the topic almost indispensable at this annual assemblage, not for the purpose of discussing the proposed methods for accomplishing fair prices in the sale of these articles, for that properly belongs to a kindred organization, but of considering the effect of this agitation on the future of pharmacy.'

In another part of his address he asks "Are we not justified in the belief that from the present trade conflict there will survive a higher pharmacy than that of our time?" We are sustained in this opinion by a survey of the entire situation of pharmacy in this country. "Characteristic of our country in all that pertains to science and art—our profession will not lag behind, but the followers fully equipped with knowledge and skill, will stand shoulder to shoulder with the most advanced, and with equal strides will move on to that brighter era for which they appear to be preparing."

Times have changed but in part what President Thompson said may be applied to the present conditions. What was stressed at the St. Louis meeting finds application now and our duty is to study the conditions which affect us and bettering them for greater service. The surveys that have been made of pharmaceutical practice are being studied and reported for the benefit of all concerned and, as never before, the standards soon to become official will serve the public in a larger way—unfolding opportunities that will be greatly strengthened with the completion of the Pharmacy Building in Washington.

#### ATTENDANCE AT CHICAGO WORLD'S FAIR

Attendance for the first month, May 27th to June 27th, at the Chicago World's Fair—A Century of Progress—was 2,464,413. For two weeks after the opening the attendance averaged 60,000 a day. The third week the average jumped to 81,000 a day and the fourth week it went to 112,251 a day. In its first month the Chicago World's Fair of 1893 had 1,050,000 paid admissions.

The biggest day in the first month of A Century of Progress was June 23rd, Finnish Day of Scandinavian week, with 139,452. Next was June 18th, featured by the Kiwanis International assembly, with 132,490. Visitors' registration book in the Sears Roebuck Building near the North Entrance on June 25th had more than 150,000 entries including visitors from sixty-four different foreign countries and registrations from every state in the United States and every province in Canada.

The attendance at the Pharmacy Exhibit is very gratifying, not only in the number of visitors but more particularly because of the interest shown by them in studying the displays.

# SCIENTIFIC SECTION

BOARD OF REVIEW ON PAPERS — *Chairman*, L. W. Rowe, John C. Krantz, Jr., F. J. Bacon

## STUDIES ON THE BIOASSAY OF DIGITALIS FROG METHODS

BY JAMES H. DIANDORI

### INTRODUCTION

Although the frog heart lymph sac method for the bioassay of digitalis has been official in the United States for almost a decade and a half, it has been the object of considerable criticism (3, 6, 9, 22, 23, 24, 27, 29, 30), and as a result numerous other methods (5, 6, 7, 14, 20, 22, 25, 28, 30, 31, 32) have appeared since its adoption by the United States Pharmacopœia (33). It is probable that the chief reasons for its continued recognition in the pharmacopœia are its simplicity, economy, reasonable accuracy and because it is considered to be a relatively good index of therapeutic activity.

The method of the United States Pharmacopœia limits the observation period to one hour, requires an assay temperature of 20° C, and does not refer to the sex of the frogs, whereas the method of the Geneva Conference of the League of Nations (22) designates an observation period of at least four hours, places no limitations on the assay temperature and specifies male frogs.

With these differences in mind, the following studies dealing with the assay of digitalis on frogs were made.

1. Comparison of absorption in the one and four hour lymph sac methods
2. Influence of temperature and of sex on absorption from the lymph sac
3. Toxicity of digitalis by the one hour and four hour lymph sac, the intramuscular and the intravenous methods

### LITERATURE

Since the conflicting results of various workers may be due largely to lack of uniformity in the experimental conditions and technique, a review of the literature is given below in classified form which indicates some of the probable causes leading to variable results.

1 *Species*—The U. S. P. X (33) specifies the use of the grass frog, *Rana pipiens*, while the variety known as *Rana temporaria* is generally employed in Europe. Either of these two varieties of grass frogs may be used in the method of assay described by the Geneva Conference of the League of Nations (22).<sup>1</sup>

2 *Health*—No comment is necessary on the importance of this factor. Health can probably best be maintained by keeping the frogs in running water at a temperature not exceeding 15° C, as required in the U. S. P. X (33).

3 *Size*—Houghton (16) stated that frogs of nearly uniform size should be used and based the dosage upon body weight, and later (17) recommended 15 Gm as the standard. Famulener and Lyons (10) used 40 Gm and Focke (11) 25- to 30 Gm frogs, while Roth (26) and Smith and McClosky (27) worked with 20- to 30-

<sup>1</sup> Hereafter referred to as "Geneva Conference."



Gm frogs, the limits specified by the U S P X (33). The method of the Geneva Conference allows animals weighing up to 40 Gm. These marked variations are not surprising in view of the difficulty in procuring large numbers of frogs of uniform weight.

4 *Sex*—Buhner (4) assaying digitalis on *Rana temporaria* by the frog heart-lymph sac method, concluded that females were more uniform in response than males, and finally employed females exclusively. Focke (11) believed that sex was not a factor in July, August and September. Edmunds and Hale (8) found sex a factor only in the spring months, but later Hale (12) stated that even in the mating season the greater weight of females due to enlargement of the egg sac does not render them more susceptible to digitalis when the dose is estimated on body weight. This observation was corroborated by Sollmann, Mendenhall and Stingell (29) working with ouabain, who nevertheless rejected females during the breeding season. Baker (1) found sex relatively unimportant except when the female contained a very large egg mass, when it appeared slightly more resistant. Roth (26) working with digitalin, observed a more variable absorption with females, but found that the occurrence of eggs bore no relation to the degree of absorption. No mention of sex or the occurrence of egg-masses is to be found in the method of the U S P X (33), but the method of the Geneva Conference (22) specifies the use of male frogs.

5 *Seasonal Influence*—Seasonal variation is rather intimately bound up with sex and susceptibility. Houghton (16) and Edmunds and Hale (8), believed that frogs could be used throughout the year, if the conditions were identical and if comparisons were made with a standard. Edmunds and Hale (8), however, concluded that summer assays were best. Focke (11) found that susceptibility varied only slightly in July, August and September. Hale (12) concluded that tests of digitalis by the frog heart-lymph sac method did not vary 10 per cent from September to March. Baker (2) found poor absorption most likely to occur in the spring and late autumn. Smith and McClosky (27) observed that when frogs are kept at 20° C there is little variation in seasonal susceptibility.

6 *Influence of Temperature*—Houghton (16), Famulener and Lyons (10) and other early investigators did not specify definite temperature limits for their assays. Focke (11) and Edmunds and Hale (8) kept the frogs at a temperature of not over 17° C. Hale (12, 13) later designated 22° C as the standard for his tests. Baker (1, 2) found a more ready absorption at higher temperatures, the minimum lethal dose varying inversely with the temperature. The results of Baker were confirmed by Sollmann, Mendenhall and Stingell (28, 29) while working with ouabain. They found in addition that the increase of toxicity per degree of temperature was much greater at lower than at higher temperatures between the ranges of 10° and 20° C, an observation that is in harmony with the law of the effect of temperature upon biological reactions. Roth (26) found a better absorption of digitalis preparations at 30° and 20° C than at 10° C. Smith and McClosky (27) found that the sharpness of the end reaction was best at 20° C. The U S P X (33) requires an assay temperature of 20° C while the standard of the Geneva Conference (22) does not specify a standard temperature.

7 *Amount of Fluid Injected*—Houghton (16, 17) using 15-Gm frogs, injected 0.5 cc of fluid into the ventral lymph sac, whereas Famulener and Lyons (10) used

the same amount for 40 Gm frogs Focke (11) injected 0.3 cc into each of the two leg lymph sacs Sollmann, Mendelhall and Stungell (29) specified not more than 1 cc of fluid Roth (26) found 0.5 cc of fluid satisfactory for either leg or ventral lymph sacs Hale (13) specified 0.015 cc of fluid per Gm for 20 to 35-Gm frogs, as did Baker (1, 2) who stated that a majority of healthy frogs will in one hour absorb that quantity of fluid from the ventral lymph sac The U S P X (33) requires 0.015 cc per Gm for 20 to 30 Gm frogs The Geneva Conference (22) specified that not more than 0.3 cc, or with weakly active preparations, not more than 0.5 cc, of fluid should be injected into the ventral lymph sac, any excess being injected into one or both thigh lymph sacs

8 *Character of Fluid Injected*—The liquid preparations of digitalis are aqueous or hydroalcoholic in character, hence dilutions of these liquids for injection into the lymph sac will contain varying proportions of alcohol and water or physiological saline Houghton (16, 17) dissolved strophanthin in physiological saline Famulener and Lyons (10) made all their dilutions with physiological saline, being careful to have the same alcoholic content in every case Baker (2) found that physiological saline was more readily absorbed from the lymph sac than distilled water, 25% alcohol more readily absorbed than physiological saline, but that 50, 75 and 90% alcohol were less readily absorbed than 25% alcohol Roth (26) found that when not more than 0.5 cc of fluid of the digitalis preparation was injected into the ventral lymph sac, there was no difference in toxicity whether the solvent was alcoholic or aqueous Edmunds, Lovell and Braden (9) removed all alcohol from preparations They pointed out the need for standardization along these lines, having observed that some manufacturers allow 25% alcohol in their dilutions for injection As a result of recent investigations Munch and Quier (20) claim that an alcohol content up to 30% of the fluid to be injected produces no essential or consistent differences in the assay on frogs, so that it is unnecessary to concentrate and redilute tinctures of digitalis in making assays according to the methods of the present Pharmacopœia In the standard method of the Geneva Conference (22) most of the alcohol of the preparation is removed by evaporation and replaced with distilled water, while the U S P X (33) allows a maximum of 20% alcohol, dilutions being made with distilled water It will be observed that neither the U S P X nor Geneva Conference methods specify an exact amount of alcohol in the fluid to be injected

9 *Length of the Observation Period*—Most of the frog methods for the assay of digitalis employ one of two end-points, either (a) systolic standstill of the ventricle or (b) death The smallest amount of the drug producing the effect in (a) is known as the minimum systolic dose (M S D) in (b) as the minimum lethal dose (M L D) Various methods of assay by the lymph sac (and other) methods employ different lengths of time in which these end-points may appear Houghton (16, 17) advocated a minimum lethal dose frog method with an observation period of twelve hours which in modified form appears to be preferred by others, especially European investigators (3, 6, 22, 23, 24, 25, 30, 31, 32) Famulener and Lyons (10) originated the one-hour minimum systolic dose method in the United States, where it has been most popular since its introduction thirty years ago and, in a modified form, has been the standard for a decade and a half Probably the main objections which are raised against the one-hour lymph sac method are based on

complaints similar to those of Rowe (23, 24, 25), that not enough time is allowed for absorption, and that systolic standstill at any time previous to death is not an accurate end-point. Edmunds, Lovell and Braden (9) maintain that the one-hour method is satisfactory for digitalis, but that a longer observation period is necessary for the strophanthins. While the U S P X one-hour method (33) presents obvious advantages over other frog heart-lymph sac methods in economy of time, the question is still debatable as to whether a longer period of observation such as four hours, as specified in the Geneva Conference Method (22), might not lead to more accurate results. The length of the observation period is closely allied with the factor of absorption, which is discussed below.

*10 Absorption*—Absorption of digitalis from the lymph sac depends on many factors, such as the species, sex, size and health of the frogs, the character of the solvent, the concentration of the active drug, the age of the preparation, the season of the year, the temperature of the assay, the amount of fluid injected and the length of time allowed for absorption, most of which have been discussed above. Focke (11) using his short time method and injecting into the leg lymph sacs, observed systolic standstill from greatly different doses, which he attributed to variable absorption. Hale (13) asserted that "red leg" and poor health delayed absorption. As a result of comprehensive studies on absorption from the lymph sac, Baker (2) concluded that (a) the majority of healthy frogs will absorb 0.015 cc of fluid per Gm. of body weight in one hour, (b) poor absorption is most likely to occur in the spring and late autumn, (c) light appears favorably to influence absorption, and (d) while absorption apparently is not affected by "red leg" disease, it is largely dependent on the health of the frogs and the conditions under which they are kept and handled. Roth (26), using 25% alcoholic solutions, found that the absorption and toxicity of digitalis bodies increased with the temperature, that while females showed a more variable absorption than males, the occurrence of eggs bore no relation to the degree of absorption. Paranjpe (21) found a wide variation in absorption with 25% alcoholic solutions of digitalis bodies from the lymph sacs of 40 Gm. frogs. Haskell (15) observed that as tinctures aged, their absorbability decreased. Smith and McClosky (27), while finding no constant relationship between the presence of unabsorbed fluid in the lymph sac, the condition of the heart and the size of the dose, agree that the extreme variations in susceptibility are largely accounted for by lack of absorption. Rowe (24, 25) claimed that the irritation produced by digitalin caused the secretion of a large amount of fluid into the lymph sac, thereby lengthening the time of absorption. Edmunds, Lovell and Braden (9) found that digitalis was more readily absorbed from the lymph sac than was strophanthin.

#### EXPERIMENTAL

In the autumn of 1931 while making an assay of a tincture of digitalis by the U S P X method, it was observed that absorption from the lymph sac was complete in only four out of twenty frogs. Further, observation showed that absorption was complete in two of three females, but in only two of seventeen males. These results led to a number of assays by various frog methods, the essentials of which are described on next page.

## METHODS

(1) *The U S P One Hour Frog Heart Lymph Sac Method*—This method (33) requires the use of healthy grass frogs *Rana pipiens*, twenty to thirty Gm in weight. They must be stored in a cool place in running water, where the temperature preferably does not rise above 15° C. The day before the frogs are to be used they are placed in a tank containing water at a temperature of approximately 20° C. One hour before the assay, they are weighed to within 0.5 Gm and placed in water at a depth of about one cm, which is kept at a constant temperature of 20° C during the assay. The dose of the tincture is calculated according to the weights of the frogs, and is injected into the ventral lymph sac through the floor of the mouth, the amount of fluid being about 0.015 cc per Gm of body weight. Dilutions are made with distilled water, and partial evaporation of the tincture is necessary in those cases where the alcohol content of the dilutions would otherwise exceed 20%. Fifteen to thirty minutes after the injection each frog is pithed, the heart is later exposed and examined at the end of one hour. The correct end reaction at this time is systolic standstill of the ventricle, with the auricles widely dilated. The amount producing this effect is known as the minimum systolic dose (M S D). If any of the injected drug is found unabsorbed in the lymph sac, the results with the animal must be rejected in recording the assay.

(2) *The Modified U S P Four Hour Method*—This assay differs from the U S P X method only in that four hours instead of one are allowed for the absorption of the drug.

(3) *The Intramuscular Frog Method of Dooley and Higley*—In this method (7) grass frogs, *Rana pipiens*, are used as in the U S P X method. All the alcohol of the preparation is evaporated at a temperature not over 50° C and enough alcohol is added to make 15% when the preparation is brought up to the original volume with physiological saline (0.7%). Dilutions of this modified tincture are made so that the amount of fluid injected is never more than 0.01 cc per Gm of body weight. One half of the total dose is injected diagonally into the thickest part of each thigh with a fine needle to avoid hemorrhage. Otherwise the procedures and end point are the same as those of the U S P X method.

(4) *The Intravenous Frog Method of Smith and McClosky*—This method (27) also employs the grass frog *Rana pipiens*. All the alcohol is removed from the preparation by evaporation on a water-bath at a temperature not over 50° C, the evaporation not proceeding to dryness. The residue is taken up with enough physiological saline to make a concentration of twenty to forty mg of digitalis per cc. After filtration it is diluted with physiological saline, to from two and one half to five times the original volume. The frog's brain is then pithed, the animal is fastened on its back and a median incision is made over the ventral lymph sac. The drug is slowly injected (tuberculin syringe, 26 gauge needle) into the right or left musculo-cutaneous vein which is clamped after the needle is removed. The animal is then returned to the constant temperature tank, and at the end of one hour its cord is pithed and the examination is made in the usual manner. The end point is the same as in the U S P X method.

## TINCTURES EXAMINED

*Tincture "A"* A composite tincture prepared by the class in pharmacology (24 preparations of 100 cc each) during October 1931, differing from the U S P X requirements only in that it was not defatted.

*Tincture "B"* A defatted tincture made by the author according to the U S P X during the first week of December 1931.

## FROGS USED

*Frogs "A"* *Rana pipiens*, received September 1931, varying in weight from 36 to 69 Gm, stored in water in the basement at a temperature never over 15° C.

*Frogs "B"* *Rana pipiens*, received during November 1931, varying in weight from 35 to 50 Gm, stored similarly to Frogs "A."

*Frogs "C"* *Rana pipiens*, received April 1932, varying in weight from 24 to 67 Gm, stored in running water in the basement at about 15° C.

Frogs 'D' *Rana pipiens*, received May 1932, varying in weight from 24 to 44 Gm stored in running water in the basement not over 18° C

Frogs 'F' *Rana pipiens*, received May 31 1932, varying in weight from 26 to 37 Gm, stored in running water in the basement not over 20° C

#### PROCEDURE

The assays on frogs "A" and "B" in the autumn were run at temperatures varying from 22.5° to 25.5° C instead of at the standard of 20° C

Frogs ranging in weight from 24 to 67 Gm were used

Frogs "C," "D" and "F" were placed in the constant temperature tank at 20° C for one hour previous to and during the assay

All animals were weighed to within one Gm and the amount of fluid injected was adjusted so as to average about 0.5 cc, with a maximum of 0.7 cc and a minimum of 0.3 cc. The amount of alcohol in the preparations injected ranged between zero and 20%

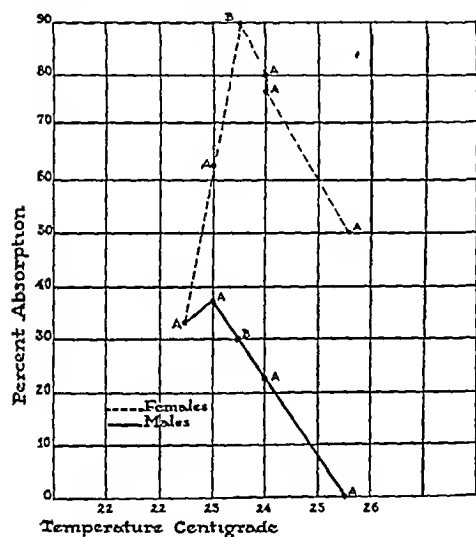


Fig 1—Absorption of digitalis tinctures A' and B' from the lymph sac of male and female frogs (*Rana pipiens*) at various temperatures by the U S P one hour method in the autumn of 1931. ----- = females ——— = males

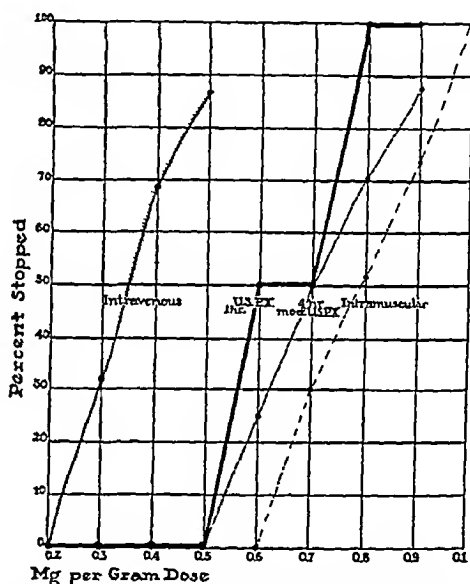


Fig 2—Comparison of systolic standstill doses of digitalis tincture B' on male frogs (*Rana pipiens*) by four assay methods in the spring of 1932, at 20° C

In the intravenous method of Smith and McClosky the modified diluted preparations were not filtered, in the intramuscular method of Dooley and Higley all of the alcohol was removed

TABLE I—THE INFLUENCE OF SEX ON ABSORPTION OF TINCTURE OF DIGITALIS FROM THE LYMPH SAC OF FROGS (*Rana Pipiens*) USING THE ONE-HOUR METHOD

Tinctures A' B'		Temperature range 22.5° to 25.5° C		
Frogs A' B'		Date of tests Autumn 1931		
		Number of Frogs Injected	Number Showing Complete Absorption	Percentage Absorption
Males		43	11	25.6
Females		54	36	66.6

Table I shows that absorption of modified tincture of digitalis from the ventral lymph sac in one hour was much better in female than in male grass frogs (*Rana pipiens*), in the autumn at temperatures ranging from 22.5° to 25.5° C, the ratio being over 2.5 to 1. At this season of the year all females contained egg masses in about the same state of development, determinations made over this period on 33 females showed that the egg masses averaged 20% of the weight of the frogs.

THE INFLUENCE OF TEMPERATURE ON ABSORPTION OF TINCTURE OF DIGITALIS FROM THE LYMPH SAC OF MALE AND FEMALE FROGS (*Rana Pipiens*), USING THE ONE HOUR METHOD

Figure 1 shows the per cent absorption in males and females plotted against the temperature and indicates that the increased susceptibility at higher temperatures is at least due partly to the increased rate and degree of absorption. The only assay made with Tincture 'B' fits perfectly with Tincture 'A' in the graph with both male and female frogs. It should be noted that while the temperatures are non-continuous environmental variations the resulting graphs are almost entirely uniform. It is also significant that in both sexes the best absorption appears between the ranges of 22.5° and 23.5° C.

TABLE II—EFFECT OF ALCOHOL CONTENT OF MODIFIED TINCTURE OF DIGITALIS ON ABSORPTION IN MALE FROGS (*Rana Pipiens*)

Tinctures A " B" Frogs 'C' 'D' 'E'			Temperature 20° C Date of Tests Spring, 1932		
Method of Assay	Alcohol Per Cent	Diluent	Number of Frogs Injected	Number Showing Complete Absorption	Per Cent Showing Complete Absorption
One hour method	Not over 20%	0.7% saline	30	3	10
One hour method	None		46	10	21.7
Four hour method	Not over 20%		9	7	77.7
Four hour method	None		52	50	96.2

Table II shows the relation between the alcohol content and the absorption of the modified tincture using the one- and four hour methods. In neither method does an alcohol content ranging from zero to 20% practically affect the degree of absorption.

TABLE III—COMPARISON OF THE ABSORPTION OF TINCTURE OF DIGITALIS FROM THE LYMPH SAC OF MALE FROGS (*Rana Pipiens*), USING THE ONE HOUR AND FOUR HOUR METHODS

Tincture B' Frogs C 'D' 'E'		Temperature 20° C Date of Tests Spring, 1932		
		One Hour Method		Four Hour Method
Dose Used (Mg per Gm)	Number of Frogs Injected	Number Showing Complete Absorption	Number of Frogs Injected	Number Showing Complete Absorption
0.2	2	1		
0.3	4	1		
0.4	4	1		
0.5	4	0	2	2
0.6	13	2	12	12
0.7	14	2	19	18
0.8	17	3	18	17
0.9	18	3	10	8
Totals	76	13	61	57
Percentage		17.1		93.4

Assays begun in the spring of 1932 with male *Rana pipiens* frogs showed such poor absorption by the one-hour method that it was decided to run parallel series of

assays in which the time allowed for absorption was increased from one to four hours. The results of this comparison are given in Table III. Absorption from the ventral lymph sac was complete in only 17.1% of 76 frogs by the one-hour method, while it was complete in 93.4% of 61 frogs by the four-hour method. (The relation of these two methods of assay to the minimum systolic dose will be discussed later.)

TABLE IV—COMPARISON OF THE ASSAY OF THE TINCTURE OF DIGITALIS BY FOUR FROG METHODS, USING MALE GRASS FROGS (*Rana Pipiens*)

Tincture 'B'				Temperature 20° C			
Frogs C, D, F				Date of Tests Spring, 1932			
Dose Used (Mg per Gm)	One Hour Method	+	Four Hour Method	+	Intramuscular Method (Dooley Higley)	+	Intravenous Method (Smith McCloskey)
	Number of Frogs Showing Complete Absorption		Number of Frogs Showing Complete Absorption		Number of Frogs Injected		Number of Frogs Injected
0.2	1	0					2
0.3	1	0					6
0.4	1	0					16
0.5	0	0	2	0	2	0	15
0.6	2	1	12	3	12	0	
0.7	2	1	18	9	20	6	
0.8	3	3	17	12	19	10	
0.9	3	3	8	7	15	11	
1.0					2	2	

+ ' indicates systolic standstill of ventricle

Table IV indicates that the minimum systolic dose is between 0.7 and 0.8 mg per Gm by either the one-hour or the four hour method (see also Fig. 2). It would appear from these results that the minimum systolic dose is practically the same by the one-hour and four-hour methods; however, the four hour method gives more definite results with a smaller number of frogs and therefore is more economical than the one-hour method. The slight divergence of the one-hour and four-hour curves between 0.7 and 0.8 mg in Fig. 2 is of little significance since the number of frogs in which complete absorption was obtained was very small in the one-hour method.

Assays made on 70 frogs by the intramuscular method of Dooley and Higley (7) gave rather uniform results as shown in Table IV and Fig. 2, and indicate approximately the same minimum systolic dose as the one- and four-hour lymph sac methods, instead of the 18.6% smaller dose observed by Dooley and Higley (7).

Thirty-nine assays made by the intravenous method of Smith and McCloskey (27) show a minimum systolic dose of 0.4 mg per Gm, or about one-half that obtained by the three other methods, a finding which is in accord with the results of other investigators. The effective dose is sharply defined (Table IV) and the toxicity curve is remarkably uniform (Fig. 2).

#### DISCUSSION

The better absorption of modified tincture of digitalis by female frogs as compared with males is not easily accounted for, particularly in the autumn. The presence of the egg-mass may be accompanied by metabolic changes which affect absorption from the lymph sac, and it would appear that such influences exert a relatively marked effect in the spawning season (spring).

The influence of the weight of the egg mass upon the size of the dose is probably an important factor. Observations made in the autumn showed that all the females contained masses of partially developed eggs, averaging 20% of the body weight. If the distribution of the absorbed digitalis in the egg-mass is proportional to that in the body tissues, no correction in dosage will be necessary. However, if the distribution in the egg mass is greater or less than in the tissues, the smallest amount producing systolic standstill will not represent the true minimum systolic dose.

#### CONCLUSIONS

1 Absorption of tincture of digitalis preparations in the autumn is much better in female than in male frogs (*Rana pipiens*) at temperatures ranging from 22.5° to 25.5° C.

2 Within the temperature ranges of 22.5° to 25.5° C, absorption was best at 23° C.

3 It appears that 'increased susceptibility' occurring with a rise of temperature may be due in many instances to the increased absorption.

4 Absorption of tincture of digitalis in the spring in male frogs (*Rana pipiens*) by the U S P X method is much more complete when the period of observation is increased from one to four hours.

5 From a practical standpoint an alcohol content varying from zero to 20% produces no marked change in the rate or amount of absorption and toxicity.

6 During the spring months the minimum systolic dose of tincture of digitalis appears to be approximately the same with the one-hour, the four-hour and the intramuscular methods, while by the intravenous method of Smith and McClosky it is about half that of the three other methods.

7 The value of the U S P X method would be augmented by limiting the assay to male frogs and by increasing the period of observation from one to four hours, both of which measures were recommended by the Geneva Conference (22) of the League of Nations in 1925.

#### BIBLIOGRAPHY

- (1) W F Baker *Am J Pharm*, 84 (1912) 247-256
- (2) W F Baker *Jour A Ph A*, 4 (1915), 443-445
- (3) J H Burn *Physiol Rev*, 10 (1930), 146
- (4) C Buhner, *Inaug diss Basel*, 1900
- (5) C W Chapman and C A Morrell, *Quart J Pharm and Pharmacol*, 4 (1931), 195
- (6) C W Chapman and C A Morrell, *J Pharmacol and Exper Therap*, 46 (1932), 229
- (7) M S Dooley and C D Higley, *Proc Soc Exper Biol and Med*, 19 (1922) 250-252
- (8) C W Edmunds and Worth Hale *Hyg Lab Bull* No 48 (1909)
- (9) C W Edmunds H W Lovell and S Braden, *Jour A Ph A*, 18 (1929), 338, 568,
- (10) L W Famulener and A B Lyons *Proc A Ph A* 50 (1902), 415-425
- (11) C Focke, *Arch Pharm* 241 (1903), 128-142
- (12) Worth Hale *J Pharmacol and Exper Therap*, 3 (1911), 458-459
- (13) Worth Hale, *Hyg Lab Bull* No 74 (1911)
- (14) P J Hanzlik, *J Pharmacol and Exper Therap*, 35 (1929), 363-391
- (15) C C Haskell, *Jour A Ph A*, 14 (1925), 492-495
- (16) E M Houghton *J A M A*, 31 (1898) 959-961
- (17) E M Houghton and H C Hamilton, *Am J Pharm*, 81 (1909), 461-474



- (18) E Knaff-Lenz *J Pharmacol and Exper Therap*, 29 (1926), 407-425
- (19) T Kruse, *Ibid*, 21 (1923), 216-217
- (20) J C Munch and A Quici, *Jour A Ph A*, 21 (1932), 1157
- (21) A Paranype *Arch experl Path Pharmacol*, 85 (1920), 109-122
- (22) Repr No 1068, *Pub Health Rep* (1926), also League of Nations Pub, C 532, m 183 (1925), 111, C H 350
- (23) L W Rowe *Jour A Ph A*, 4 (1915), 108-112
- (24) L W Rowe, *Ibid*, 17 (1928), 645
- (25) L W Rowe *Ibid*, 18 (1929), 1138-1142
- (26) G B Roth, *H<sub>2</sub>g Lab Bull* No 102 (5) (1916)
- (27) M I Smith and W T McClosky, *Pub Health Rep Supp* No 52 (1925)
- (28) T Sollmann *Cleveland Med J*, 14 (1915), 483-491
- (29) T Sollmann W H Mendenhall and J L Stungell, *J Pharmacol and Exper Therap*, 6 (1915), 533-560
- (30) J W Trevan *Pharm J*, 117 (1926), 439-441
- (31) J W Trevan *Proc Roy Soc, London (B)*, 101 (1927), 483-491
- (32) J W Trevan, Ellen Boock, J H Burn and J H Gaddum *Quart J Pharm and Pharmacol*, 1 (1928), 6
- (33) U S Pharmacopœia X (1926)
- (34) C E Vanderkleed and F S Pittenger, *Jour A Ph A*, 2 (1913) 822-830
- (35) D Vanderhoof *J A M A* 84 (1925), 1951

*The author wishes to express his gratitude to Dr George B Roth for his valuable suggestions and personal aid in the progress of this work*

DEPARTMENT OF PHARMACOLOGY AND THERAPEUTICS SCHOOL OF MEDICINE,  
THE GEORGE WASHINGTON UNIVERSITY  
WASHINGTON, D C

## A CHEMICAL EXAMINATION OF THE OIL OF ERGOT \*

BY GEORGE W FIERO

Oil of ergot is obtained by extracting the drug with petroleum ether prior to the preparation of fluidextract of ergot, U S P X The fatty oil used in this investigation was contributed by Parke, Davis & Co It was very dark colored, had a slight green fluorescence and a rancid odor

Five lots consisting of 10 litres each were saponified by refluxing each lot with 15 litres of a 70 p c alcohol solution containing two Kg of potassium hydroxide (2350 Gm of KOH, U S P X which contains 15 p c of water) This quantity was based upon the saponification value (182) established by saponifying a sample according to the U S P X process An additional 10 p c of potassium hydroxide was allowed to insure complete saponification After refluxing 8 hours, as much as possible of the alcohol was removed by distillation Since the soapy mixture had a tendency to froth and foam, it was possible to obtain only approximately one-half of the total volume of alcohol, the balance remaining in the soap solution

The saponified oil was dissolved in several volumes of water, and the solution shaken repeatedly with ethyl ether to remove the unsaponifiable matter

---

\* Part of a thesis submitted for the degree of Doctor of Philosophy, University of Wisconsin, 1932 and read by title before the Scientific Section of the A Ph A at the Toronto meeting The thesis deposited in the University Library contains numerous details in tabulated form not here reported

The aqueous solution was then acidified with cold, dilute sulphuric acid. Sufficient ether had been returned by the aqueous solution to dissolve the liberated fatty acids and form a layer above the water. The ethereal solution was removed, the ether distilled off and the fatty acids obtained in the form of a brownish gray solid. Notwithstanding the fact that sufficient sulphuric acid had been used to render the solution distinctly acid, it was found that the fatty acids contained considerable soap.<sup>1</sup> Purification was attempted by melting the acids and pouring them in a fine stream into dilute hydrochloric acid. The mixture was stirred constantly with a mechanical stirrer for one hour. The fatty acids were collected, remelted and poured into ice water with constant stirring, to remove the hydrochloric acid retained. Since they still contained considerable soap, the entire operation of melting the fatty acids, pouring into hydrochloric acid and then remelting and pouring into water was repeated. The fatty acids, however, still contained soap.

As a result of the saponification, the following products were obtained

- 1 Unsaponifiable portion of the oil
- 2 The free fatty acids
- 3 The glycerin solution

1 The *unsaponifiable portion* of the oil was turned over to Kurt Bonstedt for investigation.

2 *The Fatty Acids*. I *Preliminary Separation of the Fatty Acids*—The lead-alcohol method of Twitchel (1) was employed to separate the solid from the liquid fatty acids. One kilogram of the mixed fatty acids was dissolved in 6 litres of hot alcohol. A hot solution of 750 Gm. of lead acetate in 6 litres of alcohol was added and the mixture shaken. No precipitate formed until the liquid became cool. After standing two days at 10° to 15°, the mixture was filtered, and the residue washed with cool alcohol. The filtrate contained the unsaturated fatty acids as lead salts.

The residue was dissolved in boiling alcohol containing 0.6 p. c. acetic acid, and the solution filtered. There was but a trace of brown-colored residue which was washed with additional hot acetic acid-alcohol. After standing two days at 10° to 15°, the mixture was filtered, and the residue, consisting of the lead salts of the saturated fatty acids, was washed with cool alcohol.

A *Saturated Acids*—The lead salts of the saturated fatty acids were treated with dilute nitric acid, which liberated the fatty acids. The solution was shaken with ether, which dissolved the fatty acids, and the ethereal solution was shaken repeatedly with water in a separatory funnel until free from nitric acid. Upon evaporation of the ether, the saturated fatty acids were obtained as a faintly straw-colored, very hard mass. The yield was 315 Gm. or 31.5 p. c. of total fatty acids. Since the iodine number was found to be 3.9, the saturated fatty acids were shown to be contaminated with 4.3 p. c. of unsaturated fatty acid (calculated as oleic). This is equivalent to 14 Gm., reducing the total saturated fatty acids to 301 Gm. or 30.1 p. c. The mixture had a melting point of 53°.

---

<sup>1</sup> Matthes and his co-workers (2, 3) have shown that this oil contains considerable ricinoleic acid. It is interesting to note that castor oil soap is readily soluble in castor oil and very difficult to remove (4).

- (18) E Knafl-Lenz *J Pharmacol and Exper Therap*, 29 (1926), 407-425
- (19) T Kruse, *Ibid*, 21 (1923), 216-217
- (20) J C Munch and A Quici, *JOUR A PH A*, 21 (1932), 1157
- (21) A Paranjpe, *Arch expil Path Pharmacol*, 85 (1920), 109-122
- (22) Repr No 1068 *Pub Health Rep* (1926), also League of Nations Pub, C 532, m 183 (1925) 111, C H 350
- (23) L W Rowe, *JOUR A PH A* 4 (1915) 108-112
- (24) L W Rowe *Ibid* 17 (1928), 645
- (25) L W Rowe, *Ibid* 18 (1929) 1138-1142
- (26) G B Roth, *Hyg Lab Bull* No 102 (5) (1916)
- (27) M I Smith and W T McClosky, *Pub Health Rep Supp* No 52 (1925)
- (28) T Sollmann, *Cleveland Med J*, 14 (1915) 483-491
- (29) T Sollmann W H Mendenhall and J L Stungell *J Pharmacol and Exper Therap*, 6 (1915), 533-560
- (30) J W Trevan *Pharm J*, 117 (1926), 439-441
- (31) J W Trevan, *Proc Roy Soc, London* (B), 101 (1927), 483-491
- (32) J W Trevan Ellen Boock, J H Burn and J H Gaddum, *Quart J Pharm and Pharmacol* 1 (1928), 6
- (33) U S Pharmacopœia X (1926)
- (34) C E Vanderkleed and P S Pittenger *JOUR A PH A*, 2 (1913), 822-830
- (35) D Vanderhoof, *J A M A*, 84 (1925), 1951

*The author wishes to express his gratitude to Dr George B Roth for his valuable suggestions and personal aid in the progress of this work*

DEPARTMENT OF PHARMACOLOGY AND THERAPEUTICS SCHOOL OF MEDICINE,  
THE GEORGE WASHINGTON UNIVERSITY  
WASHINGTON, D C

## A CHEMICAL EXAMINATION OF THE OIL OF ERGOT \*

BY GEORGE W FIERO

Oil of ergot is obtained by extracting the drug with petroleum ether prior to the preparation of fluidextract of ergot, U S P X The fatty oil used in this investigation was contributed by Parke, Davis & Co It was very dark colored, had a slight green fluorescence and a rancid odor

Five lots consisting of 10 litres each were saponified by refluxing each lot with 15 litres of a 70 p c alcohol solution containing two Kg of potassium hydroxide (2350 Gm of KOH, U S P X which contains 15 p c of water) This quantity was based upon the saponification value (182) established by saponifying a sample according to the U S P X process An additional 10 p c of potassium hydroxide was allowed to insure complete saponification After refluxing 8 hours, as much as possible of the alcohol was removed by distillation Since the soapy mixture had a tendency to froth and foam, it was possible to obtain only approximately one-half of the total volume of alcohol, the balance remaining in the soap solution

The saponified oil was dissolved in several volumes of water, and the solution shaken repeatedly with ethyl ether to remove the unsaponifiable matter

---

\* Part of a thesis submitted for the degree of Doctor of Philosophy, University of Wisconsin 1932 and read by title before the Scientific Section of the A PH A at the Toronto meeting The thesis deposited in the University Library, contains numerous details in tabulated form not here reported

The aqueous solution was then acidified with cold, dilute sulphuric acid. Sufficient ether had been returned by the aqueous solution to dissolve the liberated fatty acids and form a layer above the water. The ethereal solution was removed, the ether distilled off and the fatty acids obtained in the form of a brownish gray solid. Notwithstanding the fact that sufficient sulphuric acid had been used to render the solution distinctly acid, it was found that the fatty acids contained considerable soap.<sup>1</sup> Purification was attempted by melting the acids and pouring them in a fine stream into dilute hydrochloric acid. The mixture was stirred constantly with a mechanical stirrer for one hour. The fatty acids were collected, remelted and poured into ice water with constant stirring, to remove the hydrochloric acid retained. Since they still contained considerable soap, the entire operation of melting the fatty acids, pouring into hydrochloric acid and then remelting and pouring into water was repeated. The fatty acids, however, still contained soap.

As a result of the saponification, the following products were obtained

- 1 Unsaponifiable portion of the oil
- 2 The free fatty acids
- 3 The glycerin solution

1 The *unsaponifiable portion* of the oil was turned over to Kurt Bonstedt for investigation

2 *The Fatty Acids* I *Preliminary Separation of the Fatty Acids*—The lead-alcohol method of Twitchell (1) was employed to separate the solid from the liquid fatty acids. One kilogram of the mixed fatty acids was dissolved in 6 litres of hot alcohol. A hot solution of 750 Gm. of lead acetate in 6 litres of alcohol was added and the mixture shaken. No precipitate formed until the liquid became cool. After standing two days at 10° to 15°, the mixture was filtered, and the residue washed with cool alcohol. The filtrate contained the unsaturated fatty acids as lead salts.

The residue was dissolved in boiling alcohol containing 0.6 p. c. acetic acid, and the solution filtered. There was but a trace of brown-colored residue which was washed with additional hot acetic acid-alcohol. After standing two days at 10° to 15°, the mixture was filtered, and the residue, consisting of the lead salts of the saturated fatty acids, was washed with cool alcohol.

A *Saturated Acids*—The lead salts of the saturated fatty acids were treated with dilute nitric acid, which liberated the fatty acids. The solution was shaken with ether, which dissolved the fatty acids, and the ethereal solution was shaken repeatedly with water in a separatory funnel until free from nitric acid. Upon evaporation of the ether, the saturated fatty acids were obtained as a faintly straw-colored, very hard mass. The yield was 315 Gm. or 31.5 p. c. of total fatty acids. Since the iodine number was found to be 3.9, the saturated fatty acids were shown to be contaminated with 4.3 p. c. of unsaturated fatty acid (calculated as oleic). This is equivalent to 14 Gm., reducing the total saturated fatty acids to 301 Gm. or 30.1 p. c. The mixture had a melting point of 53°.

---

<sup>1</sup> Matthes and his co-workers (2, 3) have shown that this oil contains considerable ricinoleic acid. It is interesting to note that castor oil soap is readily soluble in castor oil and very difficult to remove (4).

*a Fractional crystallization* The fatty acids were dissolved in 10 parts of 95 p c alcohol and allowed to cool slowly. The solid fatty acids which separated were removed by filtration. Fractions were obtained at the following temperatures: 18° (fraction "A"), 16° (fraction "B"), 14° (fraction "C"), 12° (fraction "D"). Fractions "A" and "B" were immediately redissolved in alcohol and re-fractionated. The fractions are indicated by the following table:

Fraction	Temperature	Weight—Gm	Melting Point
A 1	20°	26.73	56.0°
A 2	12°	5.56	56.5°
A 3	4°	3.94	56.0°
B 1	20°	11.11	56.5°
B 2	12°	4.97	55.8°
B 3	4°	3.14	55.0°
C	Not refract	11.80	55.0°
D			55.0°

No satisfactory separation was effected, probably due to the formation of eutectic mixtures of the fatty acids (5) or to the formation of ethylic esters (6).

*b Fractional precipitation* Fifty grams of the mixed solid fatty acids were dissolved in 750 cc of alcohol and treated with a 10 p c solution of hydrous magnesium acetate in alcohol. The magnesium soaps did not begin to precipitate until 100 cc of magnesium acetate solution had been added. After standing 12 hours, the magnesium soaps were separated by filtration, boiled with hydrochloric acid to liberate the fatty acids and the separated fatty acids dissolved in alcohol.

This solution was treated with 15-cc portions of magnesium acetate solution, sufficient ammonium hydroxide being added after each precipitation to neutralize the acetic acid freed. The solution was stirred while the magnesium acetate was being added, allowed to stand for at least one hour and the magnesium soap separated by filtration. Fractions 1 to 6, inclusive, were obtained from this solution, No. 6 being the residue after removing the alcohol.

Fractions 7 to 15, inclusive, were obtained in the same manner from the filtrate obtained from the above-mentioned magnesium soaps precipitated with 100 cc of magnesium acetate solution. Fraction 15 was the residue.

The melting points of the magnesium soaps are not satisfactory for identifying the fatty acids as becomes apparent from the following tabulation:

Myristic acid m p 53.8°	Mg myristate m p 150.4°
Palmitic acid m p 62.6°	Mg palmitate m p 121-122°
Stearic acid m p 69.3°	Mg stearate m p 132°

Therefore, the fractions were boiled with dilute hydrochloric acid, cooled, filtered and the residue washed with water. The freed acid was then recrystallized from alcohol. The following fractions of free fatty acid were thus obtained:

Fraction	Weight—Gm	Melting Point
1	1.95	51.0-51.2°
2	2.44	53.8-54.0°
3	1.11	53.5-54.0°
4	4.07	55.5-56.0°
5	1.65	Softened 30° Melted 44°

6	12 10	(Residue)
7	1 60	55 5-55 7°
8	2 10	43 0°
9	1 20	42 0°
10	5 20	55 5-56 0°
11	7 15	56 0°
12	0 33	58 5-58 7°
13	0 50	24 0°
14	1 00	60 5-60 7°
15	6 80	(Residue)

-----  
49 20 Gm

*c Fractional distillation of methyl esters* The mixed solid fatty acids (185 Gm) were refluxed with 370 cc of methyl alcohol containing 9 cc of concentrated sulphuric acid. The excess methyl alcohol was recovered by distillation, and the methyl esters were dissolved in ether. This ethereal solution was washed with water until free from mineral acid. The ethereal solution was then dried with anhydrous sodium sulphate, and the esters obtained by distilling the ether.

The methyl esters thus prepared were distilled in a modified Claisen flask on an oil-bath at a pressure of 8 mm. The following fractions were collected:

#### FRACTIONAL DISTILLATION I

Fraction	Boiling Range	Weight—Gm	Melting Point
I	174-179°	31 62	28 0-28 5°
II	179-180°	46 92	26 5-27 0°
III	(Bumped over)	20 95	
IV	181-182°	27 05	24 8-25 2°
V	183-188°	21 14	24 0-24 2°
VI	188-196°	9 10	19 8-20 2°
VII	196-200°	5 76	28 5-29 5°
VIII	(Residue)	9 06	

The fractions were redistilled as follows. Nos. I and II were distilled to 178°, III and IV were then added to and distilled with 182°, V was added to and distilled with 186°, VI was added to and distilled with 190°, VII and VIII were added to and distilled with 200°. A second group of fractions was obtained as indicated by the following table:

#### FRACTIONAL DISTILLATION II

Fraction	Boiling Range	Weight—Gm	Melting Point
A	173-174°	28 18	28 2°
B	175-178°	75 06	25 8-26 3°
C	178-182°	20 71	23 0-23 2°
D	182-186°	19 26	20 5-21 8°
E	186-194°	11 46	22 5-23 0°
F	194-200°	6 81	23 0-23 5°
G	(Residue)	7 92	

The fractions were redistilled in a similar manner and the following fractions were obtained:

#### FRACTIONAL DISTILLATION III

Fraction	Boiling Range	Weight—Gm	Melting Point
1	164-168°	3 75	26 2-26 5°
2	169-171°	13 35	28 0-28 2°

Fraction	Boiling Range	Weight—Gm	Melting Point
3	172-175°	77.95	28.5-28.7°
4	176-178°	14.82	26.5-27.0°
5	179-185°	12.32	22.5-23.2°
6	186-190°	21.57	22.5-23.0°
7	190-196°	14.10	28.0-28.5°
8	197-200°	2.77	30.0-30.2°
9	201-206°	4.60	32.0-32.5°
10	(Residue)	1.73	

The quantitative separation of the solid fatty acids is very difficult when one considers that they differ only about 10 p. c. in molecular weight. Fractional distillation of the methyl esters, which is the most satisfactory method employed, does not yield pure fractions unless, possibly, after a large number of redistillations. The fractions obtained from ergot oil, in most cases, probably contained but two saturated fatty acids. Oleic ester, although its boiling point is near that of stearic, begins to distil below its boiling point in the presence of other methyl esters (7). Thus, small amounts of oleic ester were present in all samples except No. 1, as indicated by the iodine value. After saponification, myristic acid was isolated from No. 1, stearic acid from No. 9 and the residue, and palmitic acid from Nos. 1 to 7, inclusive. Arachidic acid was not detected. The isolation of small amounts of stearic acid in a mixture with palmitic, or vice versa, is quite difficult, since the two form an eutectic mixture (the so-called "margaric acid" is considered by some to be such a mixture).

Daturic acid was not obtained from any of the fractions. Indeed, the existence of this acid is doubted by many authorities. Jamieson's recent (1932) "Vegetable Fats and Oils" does not mention daturic (or margaric) acid, although other fatty acids are considered in detail.

The following table indicates the approximate quantitative composition of the fractions. The amount of oleic ester is calculated from the iodine value. Lead oleate is less soluble in alcohol than lead linoleate or ricinoleate, hence the iodine value of the solid acids separated by the lead-salt-alcohol method is probably due to oleic acid. The amount of saturated ester may be approximated by the molecular equivalent (based upon the saponification value), after subtracting the oleic acid content.

M. E.	Weight—Gm	I. V.	Fatty Acid	P. C.	Weight—Gm
1 253.2	3.75	0.0	Myristic	44.3	1.66
			Palmitic	55.7	2.09
2 265.9	13.35	2.5	Myristic	16.6	2.22
			Palmitic	80.5	10.74
			Oleic	2.9	0.39
3 267.0	77.95	2.8	Myristic	13.6	10.60
			Palmitic	83.1	64.75
			Oleic	3.3	2.60
4 270.0	14.82	4.3	Myristic	5.0	0.74
			Palmitic	90.0	13.44
			Oleic	5.0	0.74
5 273.0	12.32	6.0	Palmitic	86.2	10.41
			Stearic	6.8	0.84
			Oleic	7.0	0.87
6 276.0	21.57	9.0	Palmitic	79.9	17.25
			Stearic	9.6	2.06
			Oleic	10.5	2.26

7	279.5	14.10	13.2	Palmitic	61.7	8.70
				Stearic	22.9	3.23
				Oleic	15.4	2.17
8	292.5	2.77	20.4	Palmitic	17.8	0.49
				Stearic	58.4	1.65
				Oleic	23.8	0.63
9	295.0	4.60	26.2	Palmitic	4.9	0.23
				Stearic	64.4	2.96
				Oleic	30.7	1.41

---

165.23 Gm

#### Summary of Solid Fatty Acids

Myristic acid	15.32 Gm	9.9 p c
Palmitic acid	78.00 Gm	83.1 p c
Stearic acid	10.74 Gm	7.0 p c
or		
Myristic acid	3.0 p c of total fatty acids	
Palmitic acid	25.0 p c of total fatty acids	
Stearic acid	2.1 p c of total fatty acids	

*B Unsaturated Acids*—The alcoholic solution of lead salts of the unsaturated fatty acids (see above) was concentrated to one-half of its volume and treated with hydrogen sulphide until no more lead sulphide precipitated. The mixture was then warmed to coagulate the lead sulphide and filtered. The residue was washed with alcohol, and the mixed filtrates concentrated in an atmosphere of carbon dioxide. The unsaturated fatty acids remained as a yellow-colored, oily liquid. Yield—624.5 Gm or 62.45 p c of total fatty acids.

The unsaturated fatty acids were separated from each other according to the method of Rosenthaler (8). They were dissolved in ten volumes of glacial acetic acid and two volumes of ether. At a temperature not exceeding 8°, this solution was treated with a solution consisting of one part of bromine and two parts of glacial acetic acid until the bromine was in excess.

The mixture was then kept at 5° for 6 hours, and the precipitate removed by decantation and filtration. This precipitate, a brownish gray solid, proved to be alpha-linolenic hexabromide, m p 181°. It was present in very small quantities, only 0.12 Gm being obtained, corresponding to 0.006 p c of the total liquid acids.

The filtrate was added to five volumes of water. A red, oily liquid separated to the bottom. The water was decanted and shaken out with ether. The separated oily liquid was then dissolved in the ethereal solution, dried with anhydrous sodium sulphate and the ether recovered. The residue consisted of 1032 Gm of red, oily liquid.

This liquid was dissolved in one litre of petroleum ether, allowed to stand at 0° for several hours and filtered. A small amount of black residue was obtained. The filtrate was then diluted with two litres of petroleum ether and allowed to stand over night at -3° to -6°. A small quantity of dark brown, viscous, oily liquid separated to the bottom. After separation of this layer, the petroleum-ether solution was washed thoroughly with water to remove the trace of acetic acid which was retained by the ether solution (see above). After standing at -3° to -6° for several days, more oily liquid separated, making a total of 163 Gm. This liquid,



according to Matthes and Schuetz (2), is dibromricinoleic acid. The 163 Gm of dibromide correspond to 89.7 Gm of ricinoleic acid.

The oily liquid was debrominated with zinc, saponified with potassium hydroxide, and neutralized with hydrochloric acid to yield the free fatty acid. This acid was then exactly neutralized with sodium hydroxide, and treated with an excess of 1.5 p.c. ice cold potassium permanganate solution. The excess permanganate was reduced with sulphur dioxide which also liberated the free fatty acids. Two trihydroxides were obtained, melting at 110° and 115°. Matthes and Kuerschner (3) obtained these two trihydroxides from ricinoleic acid from ergot oil in addition to one melting at 140–142°.

The petroleum-ether solution, after separation of dibromricinoleic acid, was concentrated and allowed to stand for 24 hours at 0° to –6°. A solid, yellow-colored precipitate formed which melted at 103°. After crystallization from petroleum ether, it melted at 113° (uncorr.). The original petroleum-ether solution was allowed to stand again for 24 hours, and additional yellowish white crystals separated. These melted at 113°. These indicated alpha-linoleic tetrabromide, m.p. 114°. The yield, 21.14 Gm, corresponds to 7.47 Gm of linoleic acid.

The filtrate was again concentrated and allowed to stand for several days at 0° to –23°. A yellow, fatty substance (m.p. 57°) separated. This substance was separated, dissolved in acetone, and cooled with freezing mixture, when linoleic tetrabromide (m.p. 114°) separated. This was filtered and the mother liquid evaporated. The oily residue was dissolved in petroleum ether from which a red, oily liquid (ricinoleic dibromide) separated on cooling. The acid value (585) indicated that the yellow substance was a mixture of 90 p.c. linoleic and 10 p.c. ricinoleic bromides.

The filtrate from which the yellow solid originally separated was evaporated. The residue consisted of 391 Gm of an oily liquid. Oxidation with dilute permanganate, after first debrominating with zinc (see oxidation of ricinoleic acid, above), yielded a dihydroxystearic acid which melted at 135° (dihydroxystearic acid from oleic acid melts at 133° to 136.5° (9)).

Thus it was found that the unsaturated fatty acids consisted of linolenic, linoleic, ricinoleic and oleic acids. The amount of linolenic was so small that for practical purposes it may be considered negligible so that the actual quantities of the other acids may be computed without it.

The acetyl value of the mixed fatty acids (59.1) indicates 35.8 p.c. of ricinoleic acid. Since the fatty acids contained 69.9 p.c. of liquid (unsaturated) fatty acids (after accounting for those which separated with the solid acids), 34.1 p.c. of the unsaturated fatty acids consisted of oleic and linoleic. The iodine value of the mixed fatty acids (73.5) indicates an iodine value of 105 for the unsaturated fatty acids. After accounting for the ricinoleic acid, the quantities of oleic and linoleic may thus be calculated. The approximate quantitative composition of the unsaturated fatty acids is indicated in the following table.

Oleic acid	30 p.c. of the unsaturated acids
Ricinoleic acid	51 p.c. of the unsaturated acids
Linoleic acid	19 p.c. of the unsaturated acids
Linolenic acid	Traces

	or
Oleic acid	20.9 p c of total fatty acids
Ricinoleic acid	35.8 p c of total fatty acids
Linoleic acid	13.2 p c of total fatty acids
Linolenic acid	Traces

*II Study of About 18 Kilos of Fatty Acids A By Fractional Crystallization*—The fatty acids were crystallized from a relatively concentrated (25 to 33 p c) alcoholic solution at various temperatures. The various fractions were then recrystallized from a more dilute solution in acetone, since a certain amount of ethyl ester was produced when alcohol was used. It was found, however, that solid fatty acids could not be satisfactorily separated from the liquid acids by this method.

*B By Fractional Distillation of Methyl Esters*—The fatty acids were then esterified with methyl alcohol and submitted to the fractional distillation process of Gruen and Janko (10). This consists in treating the methyl esters (in petroleum ether or chloroform solution) with bromine solution at 0° to 5°. After the fatty acids are entirely brominated, the mixture was washed with aqueous sodium bicarbonate solution and dried with anhydrous sodium sulphate.

The solvent was recovered, and the methyl esters subjected to fractional distillation at a pressure of 8 to 15 mm. There was considerable decomposition as was indicated by clouds of more volatile material produced below the boiling point of the esters. The first fractions obtained were straw colored, but after redistillation they were colorless. The iodine value, however, ranged from 15 to 50 indicating the presence of unsaturated fatty acids. This method was not satisfactory, possibly due to the oxidized condition of the original fixed oil.

#### SUMMARY

The solid fatty acids may be separated from each other more satisfactorily by fractional distillation of the methyl esters than by either fractional crystallization from alcohol or by fractional precipitation with magnesium acetate.

The approximate quantitative composition of the mixed fatty acids from the fatty oil of ergot is herewith tabulated.

	P C of Total Fatty Acids
Myristic acid	3.0
Palmitic acid	25.0
Stearic acid	2.1
Oleic acid	20.9
Ricinoleic acid	35.8
Linoleic acid	13.2
Linolenic acid	Traces

#### REFERENCES

- (1) Twitchel, *Ind & Eng Chem*, 13 (1921) 806
- (2) Matthes and Schuetz, *Arch Pharm*, 205 (1927), 541
- (3) Matthes and Kuerschner, *Ibid*, 269 (1931) 88
- (4) Shrader, U S Dept Agriculture Bull 687
- (5) Leathes, *The Fats* page 5
- (6) Lewkowitsch, *Chem Tech and Anal of Oils Fats and Waxes*, 5th Edition, Vol 1,

- (7) Jamieson, *Vegetable Oils and Fats*, page 295
- (8) Rosenthaler *Chem Investigation of Plants* page 83
- (9) Lewkowitsch, *loc cit* Vol 1, page 228
- (10) Gruen and Janko *Z d Deutsch Oel u Fett Ind*, 40(1921), 553 (Rosenthaler *Nachweis organischer Verbindungen*)

## A CHEMICAL STUDY OF MA HUANG \* 1

BY ALICE H HAYDEN<sup>2</sup> AND C B JORDAN

### HISTORICAL

Ma Huang presents one of the most interesting histories found in drug lore. Its antiquity, its varied rôles throughout the centuries and its recent spectacular rise to its present position in modern medicine weave a fascinating story for those interested in drugs and the relationship of pharmacognosy and chemistry to the development of medical science.

Early Chinese records (1) indicate that Ma Huang was known and used as early as the third century, B. C. The Chinese employed the drug to allay coughing, to promote sweating, to stimulate heart action, to relieve post-partum difficulties and to control fevers. Chen (2) reports that Ma Huang was usually prescribed with other crude drugs and made into a decoction and taken by the patient as such.

Ma Huang means astringent yellow. The taste is very astringent, this has been attributed to a high tannin content. There seems to be some doubt, however, as to just what is the exact application of the word "Huang" or "yellow." Some writers, Chen (3) and Nielsen (4), believe that the word yellow applies to the appearance of the dried stem, but Read (5) is of the opinion that the early literature refers to "Huang" as the color of the flower.

Ma Huang belongs to the seventh division of the Gymnospermous plants, the Gnetales. The exact botanical identity of this drug has been a subject of much confusion and discussion. The earlier investigators referred to it as *Ephedra vulgaris*, var, *helvetica*. However, recent investigations indicate that this term is now obsolete and should be dropped. The modern tendency is to consider Ma Huang as a generic term applying to various ephedrine-bearing species of *Ephedra* growing in China (5).

The drug is imported in large bales. There is no true grading of the product, oftentimes a single bale will contain several species of *Ephedra*. During the processes of collecting, drying, compressing and transporting, the plants become badly broken and most of the berries, flowers and bracts drop off so that a complete separation of the different species is practically impossible.

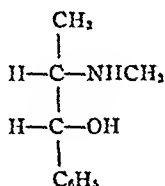
As far as can be ascertained, the first chemical investigation of the plant was carried out by Yamashita, who, in 1885, isolated an alkaloid in an impure state. After the death of the discoverer, Nagai (1887) (6) with the assistance of Hori, continued the study, purified the product and named it ephedrine. It is interesting to note, however, that the term ephedrine was first used by Loew (1875) to design-

\* Scientific Section A. Ph. A., Toronto meeting, 1932.

<sup>1</sup> An abstract based upon a thesis by Alice H. Hayden submitted to the Faculty of Purdue University in partial fulfillment of the requirements for the degree of Doctor of Philosophy. The original thesis is accompanied by a bibliography of over one thousand references.

<sup>2</sup> J. K. Lilly Fellow, Purdue University, Lafayette, Indiana.

nate a red, amorphous powder obtained from the tannin of an American species of *Ephedra* (7). The name ephedrine has also been applied to an alkaloid obtained from *Ephedra monostachya*, but investigations show that this compound is not identical with the *l*-ephedrine obtained from Ma Huang. The word ephedrine is now used only in the sense in which Nagai employed it—to designate *l*-ephedrine.



The history of ephedrine is comparable with the histories of several other of our important drugs and chemicals. This compound, like cocaine, carbon tetrachloride and phenolphthalein, was known for a long time before its most valuable medicinal properties were realized and investigated. Miura (8) (1887) subjected Nagai's ephedrine to physiologic investigations and demonstrated its mydriatic effect. The greatest pharmacologic properties of the drug were overlooked owing to the fact that early workers failed to use anything but toxic doses. Consequently, ephedrine was little used for purposes other than ophthalmologic for many years. Some experiments demonstrating the essentially sympathomimetic effects of ephedrine were conducted as early as 1917 (9), but the real therapeutic possibilities of this compound were not recognized until 1923 when Chen re-isolated the alkaloid.

There have been many studies of Ma Huang and its alkaloids but, as far as we have been able to ascertain, no complete, systematic chemical examination of this ancient remedy has been executed. We are therefore submitting the following data regarding this drug.

#### GENERAL ANALYSES

##### I Determination of Volatile Constituents

TABLE I

Sample No.	Determination No.	Moisture in %		Other Volatile Constituents		Total Volatile Constituents	
		Sample	Average	Sample	Average	Sample	Average
I	1	3.62		1.07		4.69	
	2	3.66	3.64	1.11	1.086	4.77	4.726
	3	3.64		1.08		4.72	
II	1	3.71		1.11		4.82	
	2	3.78	3.75	1.08	1.083	4.86	4.833
	3	3.76		1.06		4.82	
III	1	4.02		1.21		5.23	
	2	4.04	4.013	1.19	1.193	5.22	5.206
	3	3.98		1.18		5.17	
IV	1	4.26		1.24		5.50	
	2	4.30	4.293	1.18	1.21	5.48	5.503
	3	4.32		1.21		5.53	

## II Extraction of Samples with Various Solvents

TABLE II

Solvent	Sample No	Determination No	Weight of Sample	% Extractive	
				Individual	Average
Petroleum ether	I	1	9 78159	1 55	
		2	9 84735	1 59	1 57
Ether		1		1 36	
		2		1 34	1 35
Chloroform		1		0 588	
		2		0 572	0 58
Ethyl acetate		1		4 41	
		2		4 53	4 47
Ethyl alcohol		1		10 35	
		2		10 20	10 275
Water		1		9 46	
		2		9 25	9 355
Residue		1		72 47	
		2		72 16	72 315
				<hr/>	
				99 915	
Petroleum ether	II	1	9 94740	1 64	
		2	9 04845	1 06	1 05
Ether		1		1 32	
		2		1 37	1 345
Chloroform		1		0 65	
		2		0 69	0 67
Ethyl acetate		1		4 81	
		2		4 63	4 72
Ethyl alcohol		1		11 28	
		2		11 17	11 225
Water		1		10 33	
		2		10 46	10 395
Residue		1		70 11	
		2		70 26	70 185
				<hr/>	
				100 19	

Several American species were available to us, and, by way of comparison, the following extractions were made

TABLE III

Solvent	Ma Huang		<i>E. nevadensis</i>		<i>E. antisiphilitica</i>	
	Individual	Average	Individual	Average	Individual	Average
Petroleum ether	1 68		1 72		0 98	
	1 64	1 66	1 74	1 73	0 96	0 97
Ether	0 93		0 82		1 01	
	0 87	0 90	0 93	0 87	1 64	1 32
Ethyl alcohol	17 04		14 09		12 61	
	16 83	16 93		14 09	12 06	12 33
Water	9 70		4 07		3 52	
	9 25	9 47		4 07		3 52

## III Ash Determination

TABLE IV

Sample No	Determination No	Individual	Total Ash Average
I	1	8 59	
	2	8 66	8 626
	3	8 63	
II	1	8 12	
	2	8 30	8 393
	3	8 37	
III	1	7 92	
	2	7 78	7 85

## IV Analysis of Ash

TABLE V

Analysis for	Determination No	Individual	% of Ash Average
Water soluble ash	1	21 038	
	2	20 782	21 262
	3	21 365	
HCl soluble ash	1	59 388	
	2	59 824	60 965
	3	63 084	
Insoluble ash	1	18 972	
	2	19 381	17 764
	3	14 940	

Liu and Read (10) have called attention to the high insoluble ash content of *E sinica*. They have included this characteristic as one of the methods of differentiation of the several Chinese Ephedras *E sinica*, *E distachya* and *E equisetina*.

Chen (11) ran qualitative and quantitative tests on the ash. His tests showed the presence of chlorine, sulphur, phosphorus, calcium, potassium, sodium and small quantities of manganese and iron. We have found that magnesium is also present in the ash.

V Crude Fibre Determination <sup>1</sup>

TABLE VI

Sample No	Determination No	Individual	Crude Fibre. Average.
I	1	19 48	
	2	19 55	19 513
	3	19 51	
II	1	22 25	
	2	22 31	22 286
	3	22 30	
III	1	24 11	
	2	24 20	24 163
	3	24 16	

<sup>1</sup> U S P Methods

VI Ether Soluble Extractive <sup>1</sup>

TABLE VII

Sample No	Determination No	Non Volatile Ether		Volatile Ether	
		Individual	Average	Individual	Average
I	1	7 31		0 67	
	2	7 22	7 266	0 71	0 693
	3	7 27		0 70	
II	1	6 75		0 73	
	2	6 81	6 783	0 75	0 736
	3	6 79		0 73	
III	1	7 93		0 55	
	2	8 11	8 003	0 52	0 523
	3	7 97		0 50	

VII Alcohol Extractives <sup>1</sup>

TABLE VIII

Sample No	Determination No	Alcohol		Dilute Alcohol	
		Individual	Average	Individual	Average
I	1	17 73		20 10	
	2	17 82	17 775	19 88	19 99
II	1	18 10		19 75	
	2	17 89	17 995	19 77	19 73
III	1	16 38		21 42	
	2	16 65	16 815	21 49	21 455

VIII Water-Soluble Extractive <sup>1</sup>

TABLE IX

Sample No	Determination No	Water Extract	
		Individual	Average
I	1	10 37	
	2	10 44	10 405
II	1	10 70	
	2	10 76	10 73
III	1	14 89	
	2	15 23	15 06

IX Extractive Soluble in Purified Petroleum Benzine <sup>1</sup>

TABLE X

Sample No	Determination No	Benzine Extract	
		Individual	Average
I	1	1 99	
	2	2 21	2 10
II	1	2 33	
	2	2 28	2 305
III	1	2 44	
	2	2 68	2 56

## SPECIFIC ANALYSES

*Assays for Total Alkaloids*—Various optical, colorimetric, volumetric, gravimetric and biological assays have been devised for the determination of the total

<sup>1</sup>U S P Methods

alkaloids in ephedrine-bearing drugs and preparations. The yields obtained by different investigators are widely divergent. Generally, the earlier workers obtained lower results than the more recent investigators. Studies of the different assay processes have accounted for some of these variations, and from recent botanical studies, we now know that there are several species of *Ephedra* upon the market as Ma Huang and that some of these contain lower percentages of alkaloids than others. Some species also yield a higher percentage of *l*-ephedrine than do others. We have undertaken a special study of these methods in order to determine, if possible, the most accurate and satisfactory means of assay.

There are several factors to be taken into consideration in a study of this problem:

1. The alkaloid, ephedrine, has a melting point of 40° C. and is somewhat volatile.
2. Ephedrine is soluble in ether, chloroform, petroleum ether, alcohol and water.
3. The isomers ephedrine and pseudoephedrine, are intraconvertible. A high total yield of alkaloids is not necessarily indicative of a high *l*-ephedrine content.
4. Chloroform reacts with ephedrine under certain conditions to form the hydrochloride. According to Peterson (12) this reaction is accompanied by the formation of benzaldehyde.

We have assayed two different samples of Ma Huang according to the following methods:

1. Assay of Ephedrine by U. S. P. IX Method for Belladonna Root (13)
2. Assay of Ephedrine by U. S. P. X Method for Belladonna Root (14)
3. J. B. Williams' (15) modification of the U. S. P. X Method
4. Feng and Read (16) Direct Alkalimetric Method
5. Feng and Read (16) Hot Acid Extraction Method
6. Paul and Glycart Assay (17)
7. Hsu's Method (18)
8. Barium Hydroxide Method

The Barium Hydroxide Method of assay is as follows:

Dissolve 10 Gm. of barium hydroxide in 75 cc. of distilled water and mix thoroughly with 20 Gm. of the crude drug. Allow to macerate for two hours. Transfer the material to a percolator and pour on 100 cc. of an alcohol ammonium chloride solution (2% ammonium chloride in diluted alcohol—95% alcohol 70, water 30), and allow to macerate for 12 hours. Allow the percolation to proceed at its normal rate until 500 cc. of the same menstruum have been added. Heat the percolate on a water-bath until the alcohol has been evaporated. Shake out the alkaloids with three successive portions of chloroform using 50, 40 and 30 cc., respectively, and filter these extractions through a pledget of cotton moistened with chloroform. Filter the aqueous extract and rinse the marc with dilute ammonia. Add 10 cc. of stronger ammonia to the aqueous liquid and again extract with chloroform until a portion of the residue no longer gives a positive "Biuret" (19) test with dilute copper sulphate and sodium hydroxide. Combine the chloroformic extracts and allow to evaporate spontaneously. Dissolve the residue in a little neutral alcohol, add 20 cc. of 0.1N HCl and titrate the excess with 0.02N NaOH, methyl red being used as an indicator.

The following results were obtained using the different methods of assay for the two samples of Ma Huang:

Method	Sample I		Sample II	
	Individual	Average	Individual	Average
U. S. P. IX Assay (13)	0.864		0.735	
	0.851	0.8575	0.721	0.728
U. S. P. X Assay (14)	0.854		0.722	
	0.841	0.8475	0.703	0.7125



Method	Sample I		Sample II	
	Individual	Average	Individual	Average
Williams Modification (15)	0 972		0 840	
U S P X Method	0 961	0 966	0 819	0 8295
Feng and Read Direct	1 13		1 01	
Alkalimzation Method (16)	1 26	1 195	0 969	0 9895
Feng and Read Hot Acid (16)	1 41		1 17	
Extraction Method	1 33	1 37	1 18	1 175
Paul and Glycart Assay (17)	1 10		0 878	
Titration Procedure No 1	1 03	1 065	0 859	0 868
Titration Procedure No 2	1 04		0 880	
	1 11	1 075	0 883	0 881
Hsu s Method (18)	1 88		1 61	
	1 83	1 855	1 65	1 63
Barium Hydroxide Method	2 10		1 83	
	2 04		1 88	
	2 02		1 79	
	2 11		1 86	
	2 14	2 062	1 85	1 842

## TANNINS

We have already pointed out that Ma Huang means astringent yellow, and that the "Ma" or "astringent" refers to the taste of the drug. The literature repeatedly emphasizes the astringent taste and many references state that this is due to the presence of a tannin.

The astringent taste is also perceptible in several of the American species of Ephedra, and it has been suggested that in the case of *Ephedra nevadensis*, the remedial action of the drug is probably due to a tannin (20).

Although tannin has generally been accepted as one of the constituents of Ma Huang, yet we find little information in literature regarding this constituent of the drug. We have, therefore, undertaken the problem of determining the kind and amount of tannin present in our samples.

Generic tests on the aqueous extract of the drug indicated the possibility of a tannin being present. The following tests were given:

Reagent	Result
Ferric chloride solution	Greenish black color
Gelatin solution	Precipitate
Copper acetate	Precipitate
Lead acetate	Precipitate
Potassium dichromate	Negative
Methylene blue	Precipitate
Ammonium hydroxide	Solution readily absorbs oxygen and darkens
Potassium ferricyanide and Ammonium hydroxide	Red orange color
Fehling's solution	Reduction takes place
Basic lead acetate	Precipitate
Ammonium molybdate in concentrated Ammonium chloride	Yellow precipitate
Lime water	White precipitate
Iodine potassium iodide	
with Ammonium hydroxide	Green precipitate
Bromine water	Yellow precipitate

These tests seem to give quite conclusive evidence of the presence of a tannin. Our next step was an attempt to classify the tannin. We concluded that the tannin in Ma Huang belonged to the catechol group because it conformed to the following tests:

Reagent	Result
Iron alum	Greenish black color
Bromine water	Yellow precipitate
Concentrated sulphuric acid	A red ring forms at the point of junction
When boiled with acids	Deposits red coloring matter

The tests for pyrogallol tannins were negative. However, in order to prove still more conclusively that Ma Huang tannin was a member of the catechol group, we ran the following test: 50 cc. of the tannin solution were boiled for half an hour under a reflux condenser with 25 cc. of a mixture of 100 cc. of concentrated hydrochloric acid (diluted with an equal volume of water) and mixed with 150 cc. of 40% formaldehyde, 10 cc. of the filtrate from the above, mixed with 10 drops of 1% iron alum and 1 Gm. of solid sodium acetate gave no color.

We attempted to limit our tannin still further by running the different tests for the various tannins of the catechol group. The fact that our tannin was precipitated from its solution by the addition of lead acetate, immediately excluded the possibilities of either resorcinol or hydroquinone being present. Our tests for catechol and protocatechuic acid gave the following results:

Reagent	Result
Lead acetate	Precipitate (both)
Silver nitrate	Reduction takes place (catechol)
Fehling's solution	Reduction takes place (catechol)
Ferrous salts	Violet color (protocatechuic acid)
Ferric chloride plus sodium carbonate	Green color darkening upon addition of sodium carbonate
Ferric chloride plus sodium acetate	Green color darkening upon addition of sodium acetate

These results seem to indicate the possibility of either catechol or protocatechuic acid being present.

Since many tannins are substances of a glucosidal nature and occur in the plant in combination with a carbohydrate complex such as glucose, we endeavored to determine whether or not the tannin of Ma Huang was of this nature. We extracted the tannin from the crude drug by agitating the aqueous extract of the drug with ether and then saturating the aqueous solution with common salt and shaking with ethyl acetate. The ethyl acetate was evaporated and a yellowish brown, fluffy looking powder was obtained. Although this material looked much like a tannin, it did not conform to the usual tannin tests.

This material extracted with ethyl acetate was boiled under a reflux condenser with HCl (2%) for an hour. Upon cooling, a red amorphous powder separated out. If our original substance was a tannin, this red powder was probably a phlobaphene. After filtering the mixture, the filtrate was shaken with ether and the aqueous solution was boiled, neutralized with caustic soda and precipitated with basic

lead acetate The solution was again filtered and any lead remaining in solution was removed by the addition of dilute sulphuric acid The solution was once more filtered and the clear filtrate was heated to boiling with Fehling's solution but no reduction took place This would seem to indicate that the tannin present in Ma Huang is not in glucosidal combination

Our attempts to determine the amount of tannin present were not particularly successful We were not able to obtain concordant results with different methods of analysis nor were our results with the same methods always consistent All of our results, however, would indicate that the tannin content is above 10%

#### SAPONINS

Generic tests indicated that a saponin-like body was present in Ma Huang We also noted that after extracting the drug with benzene, ether, chloroform and alcohol, the water extract foamed strongly upon heating Some trouble with emulsions was also experienced with some of the assay processes We attempted the separation of this constituent by extracting the crude drug with hot alcohol and subsequent precipitation with ether We obtained a fluffy, flocculent, white precipitate which readily darkened and resinified after it had been filtered

We carried out this isolation process again, this time purifying the saponin by dissolving it in water and treating it with lead acetate The resulting lead salts were decomposed by treating with dilute sulphuric acid

The purified saponins thus obtained, were found to conform to the following tests for saponins

- 1 Aqueous extracts foamed readily when shaken
- 2 Concentrated sulphuric acid produced a red color
- 3 Concentrated sulphuric acid containing a little ferric chloride gave a bluish green color
- 4 Upon hydrolysis the substance yielded a reducing sugar

Therefore we have isolated and definitely established the presence of a saponin as one of the constituents of Ma Huang

#### GLUCOSIDES

Some of our generic tests seemed to indicate the possibility of a glucoside being present, however, we could not be sure that these tests were due to strictly glucosides and not to glucosidal substances such as certain tannins, pigments or saponins

In order to isolate any glucosides that might be present in the drug, we extracted the material with dilute alcohol and precipitated other materials by adding a solution of lead acetate The lead was removed from the solution by treating it with hydrogen sulphide The aqueous solution was evaporated and the residue was taken up with dilute alcohol A few crystals separated out Their solution was very bitter and did not reduce Fehling's solution until after the material had been hydrolyzed by treating with acid and refluxing for a period of ten hours This crystalline material did not have a sharp melting point as it charred The charring did not take place until the material had been heated to almost 200° C A few crystals were fused with sodium and tested for the presence of nitrogen but no positive test was obtained

From our experiments we concluded that a glucoside or a glucoside-like body was present as one of the constituents of Ma Huang

## SUMMARY AND CONCLUSIONS

- 1 A proximate analysis of Ma Huang has been made
- 2 A study of the assay methods of Ma Huang shows that there is much variation in the results obtained by using the different methods
- 3 A new method of assay using barium hydroxide for liberating the alkaloids from the plant tissue has been developed and is recommended for the determination and isolation of the alkaloids
- 4 Good species of Ma Huang should yield close to 2% total alkaloids
- 5 A catechol tannin has been found to be present as one of the constituents of Ma Huang This tannin may be catechol, protocatechuic acid or both
- 6 A crystalline substance possessing glucosidal properties has been isolated
- 7 A saponin has been isolated and determined as one of the constituents of Ma Huang

## BIBLIOGRAPHY

- (1) Shen Nung 3rd C B C Pen T'sao Kang Mu, *Am Druggist*, 77 (1928) 16
- (2) K K Chen, *Jour A Ph A*, 20 (1931), 110
- (3) K K Chen *Ibid* 14 (1925) 189
- (4) C Nielsen *Am Druggist*, 77 (1928), 16
- (5) B E Read, Transactions of the F C A T M Seventh Congress, 1929 Vol III
- (India) Thacker's Press and Directories, Ltd Calcutta
- (6) N Nagai, *Pharm Ztg*, 32 (1887) 700
- (7) R E Terry *Jour A Ph A*, 16 (1927), 397
- (8) K Miura, *Berlin klin Wochschr* 24 (1887), 707
- (9) H Amatsu and S Kubota *Koyoto Igaku Zasshi*, 14 (1917) 77
- (10) J C Liu and B E Read, *Jour A Ph A*, 18 (1929), 328
- (11) K K Chen, *Ibid*, 14 (1925), 189
- (12) J B Peterson *Ind Eng Chem*, 20 (1928), 338
- (13) United States Pharmacopœia IX (1916), 72
- (14) United States Pharmacopœia X (1926), 75
- (15) J B Williams, *Jour A Ph A*, 17 (1928) 430
- (16) C T Feng and B E Read *Ibid* 16 (1927) 1034
- (17) E A Paul and C K Glycart, *J Assoc Official Agr Chem*, 12 (1929) 290
- (18) Y D Hsu, *Jour A Ph A*, 19 (1930), 817

## THE ASSAY OF PREPARATIONS CONTAINING PEPSIN OFFICIAL IN THE NATIONAL FORMULARY \*<sup>1</sup>

BY GLENN L JENKINS AND EDWARD M HOSHALL

### INTRODUCTION

The medicinal value of pharmaceutical preparations containing pepsin is commonly considered to be dependent upon the activity of this enzyme in the digestion of proteins The present official method of assay of pepsin (1) based on the digestion of egg albumen has been shown to yield erroneous results due to numerous variable factors (2), (3) Methods have not been developed for the assay of preparations containing pepsin, consequently the only criterion of the quality of a

\* Abstracted from a thesis submitted to the Faculty of the Graduate School of the University of Maryland in partial fulfilment of the requirements for the degree of Master of Science

<sup>1</sup> Scientific Section, A Ph A, Toronto meeting 1932

preparation containing pepsin is that based on the activity of the pepsin employed in the compounding

The results of a prescription survey by Gathercoal (4) indicate that the National Formulary preparations containing pepsin are extensively prescribed in modern pharmacy. It is considered highly desirable, therefore, to develop methods for the assay of these preparations with the intent that a satisfactory method might be made official in the next edition of the National Formulary. A positive result in this study would make possible the preparation of standardized preparations containing pepsin, and it would also make possible studies of methods for the stabilization of these preparations.

#### METHODS OF ASSAY

Numerous methods have been proposed for the estimation of the proteolytic activity of pepsin. These methods may be grouped into three main classes, namely

1. Methods based on determination of unaltered substrate
2. Physical methods based on determination of cleavage products
3. Chemical methods based on determination of cleavage products

To the first group belong the methods of Ebstein and Grutzner (5), Mett (6), Volhard (7), Gross (8), Rona and Kenmann (9), Fuld and Levison (10), Rose (11), Jacoby-Selms (12) and Waldschmidt (13). This class contains the methods of historical significance, and while they permit relative measurements, they are not of sufficient accuracy to consider for this work.

The second group comprises the work of Fermi (14), Palitzsch and Walbum (15), Henri and Bancel (16), Abderhalden and Koelker (17), and Allen (18), Northrop (19) and Spriggs (20). With the exception of the method of Abderhalden and Koelker which is only applicable for use with optically active peptides, the others are too restricted in their applicability and not suited for a general method.

The remaining group contains the methods of Van Slyke (21), Sørensen (22), Willstätter and Waldschmidt-Lertz (23), Volhard (24), Foreman (25) and Jenkins and Greenberg (26). The methods were all reviewed but since that of Greenberg is by far the simplest and appears to be the most generally applicable, it was selected for a study of the determination of pepsin in National Formulary preparations.

#### EXPERIMENTAL PART

In order to obtain a working knowledge of the method, four samples of commercial pepsin were obtained. Pepsin A had been repeatedly assayed by the U S P X method and its proteolytic activity was determined to be 92 per cent. Pepsin B was assayed by the A O A C method (27) and using Pepsin A as standard, a proteolytic activity of 115 per cent was found for Pepsin B. Pepsin C and Pepsin D were unassayed samples each from a different manufacturer.

The following pepsin containing preparations of the National Formulary 5th Edition (1926) were compounded: *Elixir Pepsini*, *Elixir Pepsini Bismuthi Et Strychninae*, *Elixir Pepsini Compositum*, *Elixir Pepsini Et Bismuthi*, *Elixir Pepsini Et Rennini Compositum*, *Liquor Pepsini*, *Liquor Pepsini Antisepticus*, *Liquor Pepsini Aromaticus*, *Glyceritum Pepsini*, *Pepsinum Saccharatum*.

The methods used in their preparation were essentially the same as specified in the National Formulary except that all weighings were made on the analytical balance, volumes were made at 20° C. in volumetric apparatus and little or no agitation was used to effect solution of the pepsin. The solutions were carefully filtered (covered to prevent evaporation) into four

ounce, narrow mouth, amber bottles, stoppered and sealed with wax, and kept at 15° C except when a sample was withdrawn. In all cases, the maximum amount of pepsin specified by the National Formulary was used. The pepsin used in all the preparations was Pepsin A.

The method of Greenberg was followed with one modification, namely, 20 cc of 0.1N NaOH was added instead of 100 cc of 0.02N NaOH, thus reduced the total volume and made the titration more accurate. The method as modified was:

Pipette 25 cc of the casein solution into a 350 cc Erlenmeyer flask. Stopper the flask and warm to 40° C in a constant temperature bath. Add 25 cc of the pepsin solution, stopper, invert the flask once and allow to digest at 40° C in the constant temperature bath for 15 minutes. Remove the flask from the bath, add 25 cc of the formaldehyde solution and rotate the contents of the flask for 2 minutes. Add 20 cc of 0.1N NaOH, mix well and titrate the excess of alkali with 0.02N HCl. Conduct a blank test in the same manner. Subtract the number of cc of 0.02N HCl consumed in the actual test from the number of cc used in the blank. The difference represents the number of cc of 0.02N alkali required to neutralize the acidity developed during proteolytic digestion. Divide the result by 3 and multiply by 100 to obtain the percentage strength of the pepsin. The figure 3 is equivalent in terms of 0.02N alkali of pepsin of 100 per cent activity. Since each 0.1 cc of difference in the amount of alkali found in the blank test corresponds to 3.33 per cent of proteolytic activity, all volumetric measurements must be made with considerable accuracy.

Using the modified method, six duplicate determinations were made on Pepsin A and Pepsin B, with the following results:

TABLE I—PROTEOLYTIC ACTIVITY

Pepsin A		Pepsin B	
1	2	1	2
97.3	100.0	96.7	98.3
100.3	108.0	106.3	109.3
100.0	101.7	103.3	108.3
105.0		108.5	109.7
98.3	103.3		
102		Average	105

The checks on duplicate determinations are within experimental error, but a 12 per cent maximum deviation on determinations leaves much to be desired. The proteolytic activity of the pepsin samples as determined by the U. S. P. X method check the proteolytic activity as here determined by 10 per cent.

The method of assay was applied to the following pepsin preparations as tabulated below. In each case the preparations were taken from storage at 15° C and when at 20° C a volume was removed, such that when diluted, 25 cc of the solution contained 0.025 Gm of Pepsin A. The proteolytic activity was calculated the same as in the original method, namely that the number of cc difference of 0.02N HCl between the sample and the blank determination, was multiplied by 33.33 which expressed the proteolytic activity in per cent. The following results were obtained:

TABLE II

Preparation	Proteolytic Activity in Per Cent			
	1	2	3	4
Glyceritum Pepsini	47.6	56.6	50.3	54.3
Pepsinum Saccharatum	105.3	104.7	101.0	102.7
Elixir Pepsini	67.3	66.3		
Liquor Pepsini Aromaticus	68.0	69.0		
Liquor Pepsini Antisepticus	67.7	67.0		
Liquor Pepsini	100.3	103.0		
Liquor Pepsini Et Bismuthi	142.7			
Liquor Pepsini Et Strychninae	139.7	147.7		
				Ave
				52.2
				103.4
				66.8
				68.5
				67.4
				101.7
				142.7
				143.7

The result of this series of determinations shows that except in the case of Pepsinum Saccharatum and Liquor Pepsini the method is not applicable to the assay of these preparations.

Thus only in two cases out of eight does the amount of pepsin added compare favorable with that found. The other six samples vary from 40 per cent to 152 per cent. The causes for these variations were considered to be as follows:

1 With one exception (*Pepsinum Saccharatum*), diluted hydrochloric acid is used in making up the preparations and the acidity of the sample is not accounted for in the assay. For example, it can be calculated that for *Elixir Pepsini* this error would be equivalent to a proteolytic activity of 16 per cent. In other preparations the error would be still greater.

2 Essential oils and other flavoring materials are employed to make the preparations. If there were a reaction of these materials with any reagents used, due to the fact that no blank is run on the sample, this would be unaccounted for.

3 There may be a reaction between the formaldehyde and the pepsin.

4 The  $p_H$  of the digestion mixture may be a factor. Although the  $p_H$  of the substrate, casein, is prepared at  $p_H$  1.4, the added pepsin containing solutions of various acidities will change this  $p_H$ .

5 The difficultly determined end point.

It was then decided to temporarily discontinue work on National Formulary preparations and using samples of commercial pepsins to evolve a method where variations due to the "reagent blank" might be accounted for and to subject the method to further study in the light of the following factors:

- 1 The acidity of the aqueous solution of pepsin,
- 2 The reaction between pepsin and formaldehyde,
- 3 The effect of  $p_H$  on degree of proteolytic activity, and
- 4 The difficultly determined end-point.

*1 Acidity of the Aqueous Solution of Pepsin*—The four commercial samples of "U S P Quality" Pepsin as previously described, were used as representative. Solutions of 0.25 per cent were prepared in pure distilled water and a 10 cc aliquot titrated with 0.02N NaOH, using two drops of 1 per cent phenolphthalein in neutral alcohol as indicator, to a faint pink.

TABLE III

Pepsin	Concentration	No Cc	Cc 0.02N NaOH	
A	0.25	10.0	1.20	1.25
B	0.25	10.0	0.47	0.46
C	0.25	10.0	2.75	2.80
D	0.25	10.0	0.90	0.85

On the basis of the factor used in the Greenberg assay, namely, 3.00 cc of 0.02N acid equivalent to 100 per cent proteolytic activity, the results here indicate that due to the acidity of the sample an apparent proteolytic activity ranging from 15 per cent to 93 per cent could be obtained. No account of this factor was taken in the original assay, obviously it must be accounted for, either by another titration or by its inclusion in the "reagent blank."

*2 The Reaction between Pepsin and Formaldehyde*—Three commercial samples of pepsin (Pepsin A, C and D) were used. A 0.25 per cent solution, in pure distilled water of each sample, was prepared and a 10 cc aliquot was titrated with 0.02N NaOH, using phenolphthalein (1 per cent in neutral alcohol) to a faint pink color. To this was added 10 cc of a 40 per cent solution of "Reagent Quality" formaldehyde, which had been previously rendered neutral with sodium hydroxide, using phenolphthalein as indicator. Upon the addition of the formaldehyde the solution became acid; the acidity then being determined by titration with 0.02N NaOH using phenolphthalein, to a faint pink color.

TABLE IV

Pepsin	Concentration Per Cent	No Cc. Pepsin (Neutral)	No Cc Formaldehyde (Neutral)	No Cc 0.02N NaOH (to Neutralize)	
A	0.25	10.0	10.0	1.81	1.80
C	0.25	10.0	10.0	2.65	2.60
D	0.25	10.0	10.0	2.20	2.24

Table IV shows that there is a definite relation between the pepsin in aqueous solution and the formaldehyde

To determine if this relation was proportional to the amount of pepsin present varying amounts of pepsin were treated with neutral formaldehyde

TABLE V

Pepsin	Concentration Per Cent	No. Cc Pepsin (Neutral)	No. Cc Formaldehyde (Neutral)	No. Cc 0.02N NaOH (to Neutralize)
A	0.25	10.0	10.0	1.80
A	0.25	20.0	10.0	3.55
A	0.25	30.00	10.00	5.67
A	0.25	40.00	10.0	7.32

Table V indicates that the reaction is directly proportional to the amount of pepsin present

The amount of pepsin was then held constant and the amount of formaldehyde varied, with the following results

TABLE VI

Pepsin	Concentration Per Cent	No. Cc Pepsin (Neutral)	No. Cc Formaldehyde (Neutral)	No. Cc 0.02N NaOH (to Neutralize)
C	0.25	10.0	1.0	2.15
C	0.25	10.0	2.0	2.35
C	0.25	10.0	5.0	2.55
C	0.25	10.0	10.0	2.65
C	0.25	10.0	20.0	2.64

It appears from Table VI, that within limits, the amount of formaldehyde is not a factor in this reaction

A definite reaction therefore, proportional to the amount of pepsin present, takes place when formaldehyde is added to aqueous solutions of pepsin. The blank accordingly, of the Greenberg Assay, should take care of this reaction or else a separate titration and correction should be applied to the existent method. In view of the lack of positive knowledge concerning the structure of pepsin, Hammarsten (28), the cause of this reaction can only be conjectured. Sherman (29) and Johannesson (30) indicate that formaldehyde in concentrations from 5 to 10 per cent does not inhibit the proteolytic activity of pepsin.

3 *The Effect of Hydrogen Ion Concentration on the Proteolytic Activity of Pepsin*—The lack of a satisfactory quantitative method precludes experimental work, but a survey of the literature relative to the proteolytic action of the enzyme pepsin on casein, notably the work of Northrop (31) and Grant (32), indicates that the optimum proteolytic activity is approximately at  $pH$  1.8 to  $pH$  2.0. In the following experimental work this acidity is maintained within those limits rather than at  $pH$  1.4 as was the case in the Greenberg Assay.

4 *The Difficultly Determined End Point*—The determination of the end point is effected by titration of the digestion mixture, the formaldehyde and the excess alkali (a total volume of some 200 cc.) with 0.02N acid. A check to within 0.30 cc. (5 drops) is difficult, save only to the analyst who has performed the titration many times. Jodidi (33) comments upon the unsatisfactory end point in a like titration. It was found by experiment that slight modifications in the procedure gave a better end point, namely: 1. It is possible to use 20 cc. of 0.1N NaOH in place of 100 cc. of 0.02 NaOH with a decrease of volume and an increase of accuracy. 2. The pepsin solution may be made more concentrated, 10 cc. of a 0.25 per cent solution being used instead of 25 cc. of a 0.10 per cent solution. 3. The amount of formaldehyde was reduced from 25 cc. to 15 cc. as the latter amount was found to be sufficient. 4. By the use of a blue light to titrate, the red tinge due to the phenolphthalein could be more closely followed, and more accurate results obtained.

#### DISCUSSION OF RESULTS

The application of the Sørensen formal titration method as modified by Greenberg, to the assay of pepsin containing preparations official in the National Formulary, was unsuccessful. The method was considered unsuited for the following reasons:



1 In an effort to find the source of difficulty, commercial samples of pure pepsin were assayed by the Greenberg Method. The results for two samples were in fair agreement with those obtained by Mr. Greenberg, but when other samples were analyzed by the same method, serious discrepancies were observed, and it was indicated that the results obtained were not in proportion to the proteolytic activity.

2 Several samples of pepsin tested showed definite and different acidities in aqueous solution. Because of the fact that a blank was not run on the pepsin solution, this initial acidity was entirely unaccounted for. Thus a pepsin with a high acidity would assay a high proteolytic activity.

3 For all samples of pepsin examined, there was a definite reaction with formaldehyde and different amounts of acid were liberated, which affected the results of the assay.

4 The consensus of recent work with the enzymic action of pepsin on casein indicates that  $p_H$  2.0 is the optimum hydrogen ion concentration rather than  $p_H$  1.4 as used.

5 The determination of the end-point in the method was difficult and the modifications suggested and used, although rendering the titration more accurate, still leave much to be desired.

6 The formaldehyde was a source of apparent error; commercial samples being difficult to neutralize, turning brown and quickly developing acidity on exposure to air.

7 Another point is suggested when we find the ratio of pepsin to casein as 1:1 while pepsin will digest 3000 times its weight of egg albumen.

#### FOREMAN'S METHOD

Foreman (25) proposed a method for the assay of pepsin based on the proteolytic splitting of protein and titration of the liberated carboxy groups in 80 to 90 per cent ethyl alcohol solution, where the free amino groups form no compounds with the phenolphthalein used as indicator, and consequently the acid alone can be titrated with standard alkali in alcoholic solution. The improvements on the original method by Willstätter and Waldschmidt-Leitz (23) indicate a method that is generally applicable for most proteolytic degradation products. The method was slightly modified and the following procedure was adopted in order to determine the proteolytic activity of samples of pepsin previously assayed by the U. S. P. X. method.

#### Reagents

- 1 A 0.25 per cent solution of pepsin, freshly prepared, in pure distilled water.
- 2 Casein solution, prepared as follows: to 45 cc of 0.5N HCl in a 250 cc volumetric flask, add 5 Gm of Hammarsten's Casein (Merck) and 150 cc of distilled water. Heat on a water bath until a clear solution is obtained. Remove, cool and fill to mark. Add 5 cc of xylene as preservative.
- 3 Phenolphthalein indicator solution. A 1 per cent solution of phenolphthalein in neutral alcohol.
- 4 Alcoholic 0.02N HCl.
- 5 Alcoholic 0.1N NaOH.

#### Procedure

Measure 10 cc of the casein solution into a 250 cc Erlenmeyer flask, warm to 40° C, then add 10 cc of the pepsin solution, shake with a swirling motion and allow to remain in the bath 20 minutes. Remove, cool to room temperature, add 100 cc of ethyl alcohol, 10 cc of 0.1N NaOH and 2 cc of indicator solution. Titrate to the disappearance of the pink color.

The blank is determined as follows: To 10 cc of the casein solution add 100 cc of alcohol, 10 cc of 0.1 alcoholic NaOH, 10 cc of pepsin solution and 2 cc of indicator. Titrate to the same end-point as above.

The difference in the number of cc of 0.02N alcoholic HCl required between the blank and the sample, indicates the apparent proteolytic activity.

Several determinations were carried out by this method. The temperature was maintained at 40° ± 2° C. The casein solution as prepared was of  $p_H$  1.8 and when the sample was added the  $p_H$  was 1.85 to 1.90. The time of digestion was 20 minutes. For the same sample of pepsin (Pepsin A), the following results were obtained, expressed in cc of 0.02N alcoholic HCl difference between the blank titration and the titration of the digested protein:

TABLE VII

No. of Run	Cc. 0.02N HCl (Difference)	Cc. 0.02N HCl (Difference)	Casein Solution
1	1.06	4.18	A 2.0 Gm /100 cc
2	0.32	0.40	B 2.0 Gm /100 cc
3	4.26	3.80	C 2.0 Gm /100 cc
4	3.60	3.96	C 2.0 Gm /100 cc
4	3.95	3.78	C 2.0 Gm /100 cc
Average	3.95		

With the exception of Run No. 2, the results were fairly reproducible. The checks on duplicate determinations are poor and the maximum deviation from the average is about 9 per cent.

To test the applicability of the method to National Formulary pepsin containing preparations, samples of Elvir Pepsin, Pepsinum Saccharatum and Glycerium Pepsinum (see page No. 3) were removed from storage (they were four months old), and a quantity diluted so that 10 cc. contained the equivalent of 0.025 Gm. of Pepsin A, the same amount of pepsin as used in the above runs. The results are as follows:

TABLE VIII

Preparation	Cc. 0.02N HCl (Difference)	Cc. 0.02N HCl (Difference)	Casein Solution
Pepsinum Saccharatum	3.68	3.78	D 2.0 Gm /100 cc
Elvir Pepsinum	3.46		D 2.0 Gm /100 cc
Glycerium Pepsinum	3.42	3.33	D 2.0 Gm /100 cc

The acidity developed for the above preparations compared with like amounts of Pepsin A is lower, as would be expected due to decrease of proteolytic activity resulting from agitation in preparation and storage. The question then arises as to whether the acidity developed is directly proportional to the amount of pepsin present. Varying amounts of pepsin were then used to digest the casein, following the same method as before.

TABLE IX

Sample	Cc. 0.02N HCl (Difference)	Cc. 0.02N HCl (Difference)	Casein
10 cc. (heated to 100°)	0.21		2.0 Gm /100 cc
5 cc. 0.0125 Gm.	2.75	2.45	(New lot which
10 cc. 0.0250 Gm.	3.10	3.06	dissolved with
15 cc. 0.0375 Gm.	4.39		difficulty)
20 cc. 0.0500 Gm.	4.78		

By inspection of the above results it is seen that when the concentration of the pepsin is varied the acidity developed is not directly proportional to the amount of enzyme present. A partial explanation is that the substrate, casein, must be increased if proportional results are to be obtained. Furthermore, according to Volhard and Lohlein (34) casein combines with a definite amount of HCl, and if the casein is digested by the enzyme, the combined acid is liberated. Thus in any case of casein digestion by pepsin, there will be two sources of acidity developed: 1. Acidity due to the proteolytic splitting of the protein which is titratable if the amino groups are 'blocked off' with either formaldehyde, acetone or alcohol; 2. Acidity developed by digestion of the casein combined with HCl with the subsequent liberation of the HCl.

The method was considered unsuitable, for the following reasons:

1. A 2 per cent solution of casein is difficult to prepare and to preserve. Different lots of Hammarsten's Casein (Merck) were found to have different solubilities. Regarding the preservation, Treyer (35) and Price (36) show that chloroform injures all enzymes to a varying extent, and they further find that ether and alcohol have very little effect while toluol has even less effect on enzymes. Toluol was first used; then xylene was tried and found to be appreciably better as a preservative.

2. Titration with 0.02N alcoholic HCl in a volume of 125 cc. using phenolphthalein, is difficult, and checks within 0.30 cc. are unusual, and obtained only with practice.

3 The acidity developed is not in direct proportion to the amount of pepsin present

4 Results with identical solutions of casein were not reproducible within 10 per cent, and even greater variations were found with the use of different batches of casein

5 The titrated acidity in any of the methods whereby the amino group is blocked off, is not due to the presence of the remaining acid group alone, but also another factor the break down of an addition product of casein with HCl, which liberates HCl that is titrated along with the proteolytically developed acidity

6 This method was discarded

#### ACETONE TITRATION METHOD

Although it has been indicated that in any method where casein is digested, and the amino groups "blocked off," the results are not directly proportional to the amount of pepsin present, and are of doubtful value, it was decided to investigate the method recommended by Waldschmidt (37). According to K. Linderstrom-Lang (38) the proteolytic mixture is titrated with 0.1N HCl in alcoholic solution, after adding acetone from 85-95 per cent concentration. This method will effectively block off most amino groups. With some slight modifications the method was essentially the same as that of Forman. The procedure is as follows:

Add 10 cc of the casein solution to a 250 cc Erlenmeyer flask, heat to 40° C and then add 10 cc of pepsin solution shaking with a swirling motion, allow to remain on bath 20 minutes, remove, cool to room temperature and add 100 cc of acetone, 10 cc of 0.1N alcoholic NaOH and 2 cc of indicator solution. Titrate with 0.02N alcoholic HCl to a faint pink.

The blank is determined as follows: To 10 cc of the casein solution add 100 cc of acetone, 10 cc of 0.1N alcoholic NaOH, 10 cc of the pepsin solution and 2 cc of the indicator solution. Titrate to the same end point as above.

The difference in the number of cc of 0.02N alcoholic HCl required is a measure of the apparent proteolytic activity.

Three determinations were made by the above method, and then the concentration of the pepsin was varied. The results are given:

TABLE X

Sample (Pepsin A)	Cc 0.02N HCl (Difference)	Casein
10 cc	3.41	2.0 Gm /100 cc
10 cc	3.90	(casein was
10 cc	3.60	difficultly
5 cc	2.76	soluble)
10 cc	3.60	
15 cc	4.39	
20 cc	4.78	

The results show that close checks on identical samples were not obtained, and that the developed acidity was not directly proportional to the pepsin present. The end point of the titration was much more accurate than when the alcohol was used to "block-off" the amino groups. The casein itself is a source of trouble, since it is difficultly soluble, does not form a clear solution and ultimately settles out. To offset this, the use of solid casein instead of the solution was next investigated. The method was the same except that 0.5 Gm of Hammarsten's Casein (Merck) was used and 10 cc of 0.1N HCl added giving a  $p_H$  of 1.9.

TABLE XI

Sample	Cc 0.02N HCl (Difference)	Casein
10 cc (heated to 100)	0.10	0.5 Gm ,
2 cc	0.010 Gm	(Hammarsten's)
5 cc	0.025 Gm	
10 cc	0.050 Gm	
20 cc	0.100 Gm	

Under the new conditions, increasing both the concentration of pepsin and casein, it was found that increased acidity was the result. As before, the acidity is not satisfactorily proportional to the amount of pepsin. The increase in the developed acidity may be explained by increased enzyme concentration and also increased casein, the latter contributing acidity from the breakdown of its HCl addition product, as previously explained. The following conclusions are given for this method:

- 1 Acetone is more satisfactory as a "blocking off" medium than alcohol, since the former allows of a more accurately determined end point.
- 2 The acidity developed is not in direct proportion to the amount of pepsin present.
- 3 The use of solid casein is recommended for digestion, and in greater concentrations than hitherto used.
- 4 The method has possibilities as an empirical method, but an accuracy within 10 per cent would be difficult to obtain.
- 5 This method was discarded.

#### VOLHARD'S METHOD

Volhard and Lohlein (34) suggest a method based upon the fact that casein combined with a definite amount of HCl, and if the casein has been digested by the enzyme the combined HCl is liberated. The increase in the amount of free HCl compared with that of the original solution as determined by titration, serves as a measure of enzyme activity. The acidity of the pepsin solution is determined and added to that of the original solution. The method is as follows:

A 5 per cent casein solution is prepared by suspending the casein in a small amount of water, dissolving in NaOH solution (8 cc. of *N* NaOH per 10 Gm. of casein), making up to volume with water and warming to 90° C. Then 150 cc. of 0.7*N* HCl and 100 cc. of the casein solution are mixed, the mixture is warmed to 40° C. and the proper amount of pepsin solution is added, and the mixture is diluted to 300 cc. with water warmed to 40° C. At the end of the incubation period (24 hours usually), 100 cc. of 20 per cent sodium sulphate is added, thus precipitating the undigested casein. The solution is filtered and 100 cc. of the filtrate is titrated with 0.1*N* NaOH using phenolphthalein as indicator. The difference between the titration value of the digest and that of the original solution, and of the pepsin solution indicates the increase in acidity of the digest. When the increase in acidity is denoted by *v*, and the time of digestion in hours by *t*, the quantity of enzyme used by *f*, and *c* the actual pepsin concentration, then according to the Schütz-Borrissov Equation (39),

$$x = (f \times t) / v^2$$

A consideration of the above method from a practical standpoint will show that it is too involved and lengthy to be readily applicable. Some points of criticism are as follows:

- 1 A third titration is necessary to account for the acidity of the pepsin solution.
- 2 The casein solution is difficult to prepare and to preserve.
- 3 The acidity of a solution prepared as above, and after the pepsin had been added was found to be *p<sub>H</sub>* 2.4 which is well above the optimum *p<sub>H</sub>* for casein digestion by pepsin.
- 4 The time, 24 hours, must be reduced, if a practical rapid method is desired.
- 5 The volumes are too large, making for bulky apparatus and requiring a large working space.

A tentative method was devised as follows:

#### Reagents

Casein "Technical Grade"

Pepsin Solution (freshly made 0.1% in distilled water) or a preparation adjusted by dilution to contain 0.010 Gm. of pepsin in 10 cc.

Sodium sulphate, 20% on distilled water

Phenolphthalein Indicator, 1% in neutral alcohol

0.1*N* Hydrochloric acid

0.5*N* Hydrochloric acid

0.5*N* Sodium hydroxide

#### Method

Into a 250 cc. Erlenmeyer flask introduce 3 Gm. of powdered casein, 50 cc. of distilled water and 10 cc. of 0.5*N* hydrochloric acid. Heat the flask to 90° C.

on the water bath and then cool to 40° C. Then add the sample of pepsin and sufficient water from a burette to make the total volume 80 cc. Maintain the mixture at 40° C. exactly thirty minutes, with occasional shaking. The flask

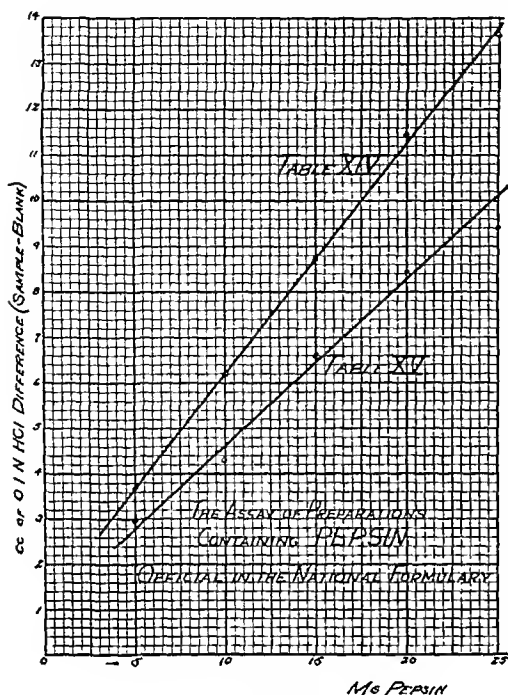


Fig 1—See Tables XIV and XV

should be lightly stoppered. Remove from the bath, add exactly 20 cc of the sodium sulphate solution, shake by swirling and filter using a folded filter. To 50 cc of the filtrate (one half the original volume), add from a burette sufficient 0.5N sodium hydroxide to have about 2 cc excess and back titrate the alkali with 0.1N hydrochloric acid using phenolphthalein indicator. Titrate rapidly to the first colorless end point.

A blank is run simultaneously as follows: Into a 250 cc Erlenmeyer flask introduce 3 Gm of casein, 50 cc of distilled water and 10 cc of 0.5N hydrochloric acid. Stopper lightly, heat to 90° C on a water bath and cool to 40° C, then add sufficient water from a burette to make the total volume 80 cc. Maintain the mixture at a temperature of 40° C for thirty minutes. Remove from the bath and add 20 cc of sodium sulphate solution, shake by swirling and filter. To 50 cc of the filtrate (one half the original volume) add about 2 cc excess of 0.5N sodium hydroxide and one half the volume of pepsin solution used in the determination. (This is necessary in order to correct for the acidity of the pepsin solution.) Back titrate with 0.1N hydrochloric acid to the same end point as in the determination.

**Calculation** The difference between the titration of the sample determination and the blank determination expressed in cc of 0.1N hydrochloric acid may be taken as an expression of the relative proteolytic activity of the product being assayed.

The standard is calculated from a series of determinations using pepsin of known proteolytic activity (standardized by U S P X Method) and plotting a graph showing the relationship between the amount of pepsin used and the cc of 0.1N hydrochloric acid difference in titration between the blank and the sample.

**Example** Standard will be Pepsin X with a proteolytic activity of 100% (U S P X). By the above method

0.005	} Gm pepsin	6.20 cc 0.1N HCl (difference in titration)
0.010		
0.015		

Sample made into solution of 0.01 Gm of pepsin (based on declaration) per 10 cc. By above method 0.010 Gm gave a difference in titration of 5.84 cc.

By interpolation we find that the sample will have a proteolytic activity of

93% 6.20 5.84

$$\frac{3.68}{2.52} \times \frac{3.68}{2.16} \times \frac{2.16}{2.52} \times (0.010 - 0.005) = 0.00428$$

$$0.005 + 0.00428 = 0.00928 \text{ Gm Standard} = 0.010 \text{ Gm} \times \frac{0.00928}{0.010} \times 100 = 92.8\%$$

Using varying amounts of Pepsin A, determinations were made by the above method with the following results

TABLE XII

Sample of Pepsin	Cc 0.1N HCl (Difference)	Comments
2 cc            0.002 Gm	3.40	Casein 5 Gm
5 cc            0.005 Gm	4.08	pH of mixture 1.80
10 cc          0.010 Gm	5.00	Time, 30 min
15 cc          0.015 Gm	8.20	Pepsin A
20 cc          0.020 Gm	10.20	

The method appears to be promising. The end point, however, is uncertain, due to the rapid return of the red color of Phenolphthalein after the first colorless end point is reached. This can be rectified by titrating rapidly. In spite of the inaccuracies of the end points a straight line relationship is indicated within the limits (0.005 to 0.020 Gm pepsin).

A second series of determinations by this method gave results as follows

TABLE XIII

Sample	Cc 0.1N HCl (Difference)	Comments
10 cc (inactive)*	0.14	Casein 5.0 Gm
5 cc            0.005 Gm	2.30	pH 1.80
10 cc          0.010 Gm	3.98	Time, 30 min
15 cc          0.015 Gm	7.70	Pepsin A
20 cc          0.020 Gm	8.92	
25 cc          0.025 Gm	12.88	
50 cc          0.050 Gm	18.36	

\* Sample of pepsin inactivated by heating to boiling

The straight line relationship as found in the first series of determinations (Table XII) was confirmed and with fair agreement, except for samples of pepsin containing less than 0.010 Gm. The end points were still a source of considerable difficulty and checks were difficult.

For a different sample of pepsin the straight line relationship was again determined between the limits of 0.005 and 0.025 Gm of pepsin.

TABLE XIV

Sample	Cc 0.1N HCl (Difference)	Comments
10 cc (inactive)*	0.03	Casein 3.0 Gm
5 cc            0.005 Gm	3.68	pH 1.85
10 cc          0.010 Gm	6.20	Time 30 min
15 cc          0.015 Gm	8.74	Pepsin B
20 cc          0.020 Gm	11.44	
25 cc          0.025 Gm	13.62	
50 cc          0.050 Gm	14.84	
100 cc        0.100 Gm	15.84	

\* Sample of pepsin inactivated by boiling

In these determinations the amount of casein used was decreased to three Gm, the result being that the end points were more readily determined.

The next determination was carried out with the reduced amount of casein, and the results were as follows

TABLE XV

Sample	Cc 0.01N HCl (Difference)	Comments
5 cc            0.005 Gm	2.96	Casein 3.0 Gm
10 cc          0.010 Gm	4.32	pH 1.85

15 cc	0 015 Gm	6 64	Time, 30 min
20 cc	0 020 Gm	8 46	Pepsin A
25 cc	0 025 Gm	9 40	

Since Pepsin A is the reference standard by means of the Schütz-Borrissov Rule, the proteolytic value of Pepsin B may be calculated. The values obtained in Tables XIV and XV are plotted and the straight lines drawn. Values obtained from the graph are given in the following table, and also by application of the equation the proteolytic value of Pepsin B was determined.

TABLE XVI

Pepsin A		Pepsin B	
Gm	Proteolytic Activity (Standard)	Gm	Proteolytic Activity From Curve By Equation
0 005	92%	0 005	134 198
0 010	92%	0 010	128 177
0 015	92%	0 015	125 169
0 020	92%	0 020	123 165

The proteolytic activity of Pepsin B having been determined to be about 115 per cent, it would appear that the Schütz-Borrissov Equation is not applicable when the time of digestion is short in fact, when using the equation the time is always taken as 24 hours. The values obtained from a comparison of the straight line relationships agree within 10 per cent.

Following the same procedure as in the preceding determinations, several samples of Pepsin A and Pepsin B of 0 020 Gm each were assayed with the following results:

TABLE XVII

Pepsin A		Pepsin B	
Cc 0 1N HCl (Difference)	Proteolytic Activity (Standard)	Cc 0 1N HCl (Difference)	Proteolytic Activity (Comparison)
8 78	92%	10 36	$(10 88/8 51) \times 92 = 118\%$
8 26	92%	10 96	
8 44	92%	11 44	
8 24	92%	10 74	
8 40	92%		
8 92	92%	Ave 10 98	
Ave 8 51			

A series of determinations, all checking within 10 per cent, indicate a proteolytic activity of 118 per cent for Pepsin B compared with the 115 per cent experimentally determined.

National Formulary Preparations were next assayed by the same procedure. The preparations were removed from storage (at 15° C.) warmed to 20° C. and a portion taken, such that when diluted with pure distilled water 20 cc would contain 0 020 Gm of Pepsin A.

TABLE XVIII

Preparation	Cc 0 1N HCl (Difference)		Proteolytic Activity (Comparison)
	I	II	
Pepsinum Saccharatum	8 30	8 56	88
Elixir Pepsini	5 72	6 16	62
Liquor Pepsini	7 58	7 28	82
Liquor Pepsini Aromaticus	7 32	6 78	79
Glycerium Pepsini	7 84	6 82	85
Elixir Pepsini et Bismuthi	8 46		91
Elixir Pepsini et Rennini Comp	9 80		106
Elixir Pepsini Bismuthi et Strychninae	7 56		82
Pepsin A (ave of 8 determinations)	8 51		92 (by exp)

Most of the preparations show a decreased proteolytic activity due to agitation and storage (They were 6 months old). Pepsinum Saccharatum gives an average of 91 per cent which

checks well with 92 per cent for the Pepsin A. Either Pepsin et Bismuth and also Either Pepsin et Rennin Comp. were but a month old which would account for the higher values obtained.

This method as developed, appears to be applicable to pepsin and pepsin containing preparations of the National Formulary. It is as accurate as the egg albumen digestion method, when applied to pepsin itself, and checks within 10 per cent are obtained with pepsin preparations. The method is simple, and a complete assay can be performed in about an hour. The greatest difficulty is an accurate determination of the end point of the titration. It is believed that this can be solved by further study, which is contemplated.

#### CONCLUSIONS

- 1 Pepsin containing preparations of The National Formulary are extensively prescribed in modern pharmacy.
- 2 The Assay of Pepsin as proposed by Greenberg is not practicable for the assay of pepsin containing preparations.
- 3 Assay methods based on proteolytic digestion of casein and subsequent blocking off of the amino group are inapplicable to pepsin or pepsin containing preparations.
- 4 The Schutz-Borrissov Rule for proteolytic digestion of casein is inaccurate when the time of digestion is short.
- 5 A modified Volhard's Method has been developed which will permit the measurement of proteolytic activity in pepsin or pepsin containing preparations within 10 per cent or less.
- 6 The method developed is rapid and simple, except for the end point of the titration.

#### ACKNOWLEDGMENT

We desire to acknowledge with thanks the loan of a Block Comparator Set, from the Larnotte Chemical Products Company, with which all  $p_H$  determinations were made.

#### BIBLIOGRAPHY

- (1) "Pharmacopœia of the United States" *Pepsinum*, page 280, 10th Edition.
- (2) Graber, *Ind. & Eng. Chem.*, 3 (1911), 919.
- (3) Vahlteich and Glover, *Jour. A. Ph. A.*, 10 (1921), 595.
- (4) Gathercoal, *National Formulary Bulletin*, I (1931), 177.
- (5) Ebstein and Grutzner, *Pflügers Arch.*, 6 (1872), 1.
- (6) Mett, *Arch. Physiol.* (1894), 68.
- (7) Volhard *Münch. med. Wochschr.*, 50 (1903), 2129, (1907), 403.
- (8) Gross, *Arch. exp. Path. Pharmacol.*, 58 (1906), 157.
- (9) Rona and Kleinmann, *Biochem. Z.*, 140 (1923), 461.
- (10) Fuld and Levison, *Ibid.* 6 (1907), 473.
- (11) Rose *Arch. Intern. Med.*, 5 (1910) 459, *C. A.*, 4 (1910) 1980.
- (12) Jacoby Selms, *Z. klin. Med.*, 64 (1907), 159.
- (13) Waldschmidt, *Pflügers Arch.* 143 (1912), 189.
- (14) Fermi *Arch. Hyg.*, 12 (1891), 238, 40 (1906) 155.
- (15) Palitzsch and Walbum *Biochem. Z.*, 47 (1912), 1.
- (16) Henri and Bancel, *Soc. Biol.* 55 (1903), 563, 787 and 866.
- (17) Abderhalden and Koelker, *H.*, 51 (1907), 294.
- (18) Allen *Pharm. J.*, (1897) 561.
- (19) Northrop *J. Gen. Physiol.*, 2 (1919) 113, 4 227.
- (20) Spriggs, *Z. physiol. Chem.*, 35, 465.
- (21) Van Slyke, *B.*, 43 (1910), 3170.
- (22) Sørensen, *Biochem. Z.*, 7 (1907), 43, 25 (1910), 1.
- (23) Willstätter and Waldschmidt-Leitz, *B.*, 54 (1921), 2988.
- (24) Volhard *Münch. med. Wochschr.*, 50 (1903), 2129.
- (25) Foreman, *Biochem. J.*, 22 (1920) 451.
- (26) Jenkins and Greenberg, *Jour. A. Ph. A.*, 20 (1931), 1032.
- (27) "Methods of Analysis," A. O. A. C.
- (28) Hammarsten, *H.*, 121 (1922), 261, 130 (1923), 55.



- (29) H C Sherman *J Am Chem Soc*, 43 (1921), 2454
- (30) Johannessoohn *Biochem Z* 83 (1917), 28
- (31) Northrop *J Gen Physiol*, 1 (1919), 607
- (32) Grant, Allen's Commercial Organic Analysis," 5th Edition, Vol 8 page 169
- (33) Jodidi *J Am Chem Soc*, 40 (1918), 1031
- (34) Volhard (see (24)) Lohlein, *Hofm Beitr*, 7 (1906), 120
- (35) Treyer *Arch physiol norm pathol*, Ser 5 10 (1898), 672
- (36) Price *Centr Bakt* 11 (1905), 14, 65
- (37) Waldschmidt, "Enzyme Actions and Properties" Tr by Walton J Wiley and Sons (1929)
- (38) K Linderstrom Lang *H*, 173 (1928), 32, 174 (1928), 275
- (39) Schutz-Borissow *Z physiol Chem*, 9 (1900), 577

## THE PHARMACOLOGICAL ACTION OF PEIMINE AND PEIMININE \*

BY K K CHEN, A LING CHEN AND T Q CHOU

The crude drug, Pei Mu, has been used in Chinese medicine as an antipyretic, cough sedative, expectorant and lactagogue (1) In combination with other ingredients, it has been advocated for the treatment of difficult labor, retention of placenta, blurring of vision and spider and snake bites

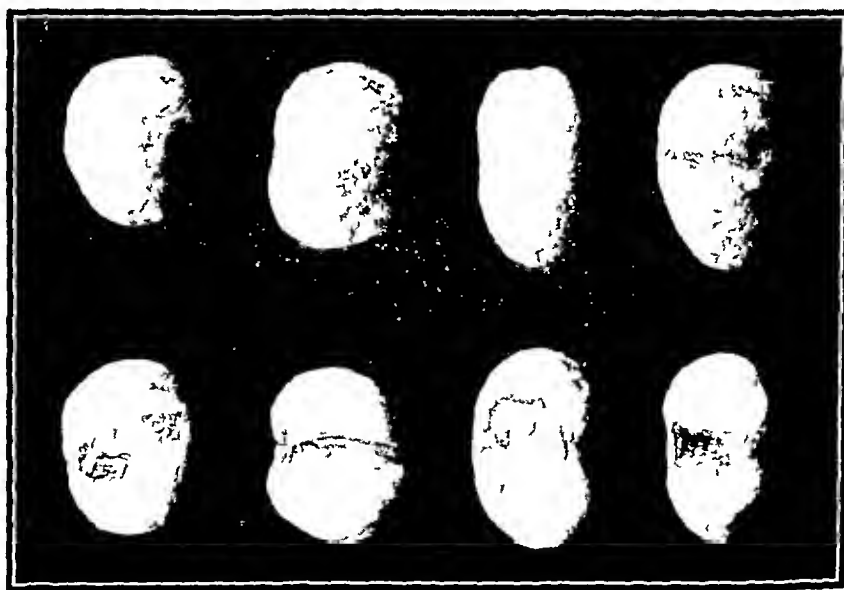


Fig 1 —Pei Mu from Chekiang Province

Pei Mu is made of the bulbs or corms of a liliaceous plant which is identified as *Frithillaria roylei* by Stuart (2), but as *F verticillata*, Willd var *Thunbergii*, Baker in Botanical Nomenclature (3) The corms produced in Chekiang Province are kidney-shaped, as shown in Fig 1, each weighing on the average 3.5 Gm, and

\* From the Lilly Research Laboratories Eli Lilly and Company, Indianapolis, and the Institute of Materia Medica National Academy of Peiping and the Sino French University, Peiping China

measuring 1.9 cm in width and 2.8 cm in length. Those grown in Szechuan Province and other localities are different in size and shape. It is possible that in Chinese commerce several varieties or species come under the same name, Pei Mu.

Yagi in 1913 (4) reported the isolation from Pei Mu of a base having the formula  $C_{23}H_{41}NO_3 \cdot H_2O$  which he named *fritilline*. This substance forms no salts with acids. It is said to depress the respiration and heart action similarly to veratrine.

In contrast to the results of Yagi, Fukuda (5) obtained two different crystalline substances: *verticine*,  $C_{18}H_{33}O_2N$  or  $C_{19}H_{35}O_2N$ , m p 224–224.5° C,  $[\alpha]_D^{10} -10.66^\circ$ , and *verticilline*,  $C_{19}H_{33}O_2N$ , m p 148–150° C.

In a previous communication (6) one of us (T. Q. C.) described the isolation of two alkaloids from the material of Chekiang origin. Although the two principles

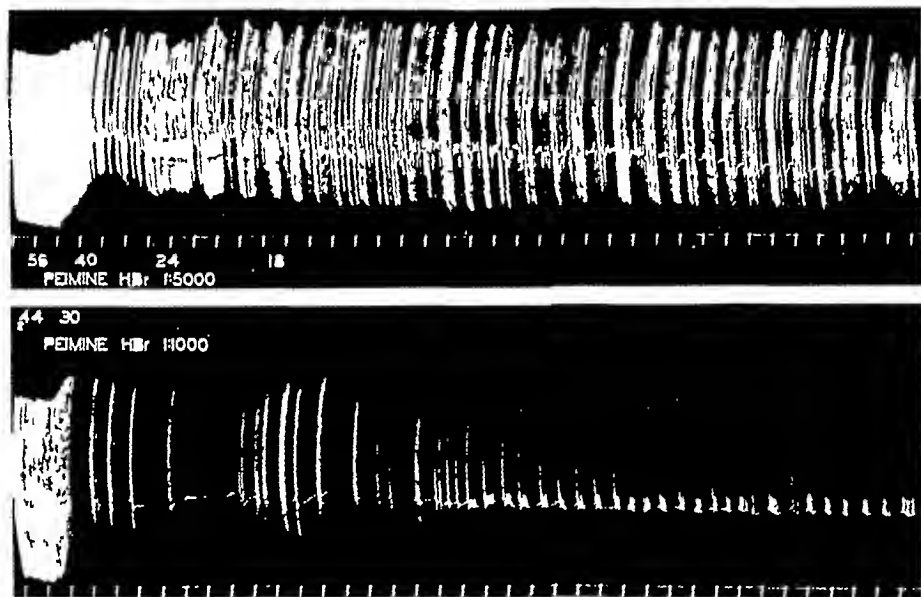


Fig 2—Action of Peimine HBr on Frog's Heart. Upper: Frog No 222, male, weighing 44 Gm, pithed. Lower: Frog No 219, female, weighing 50 Gm, pithed.

have some resemblance in elementary composition to verticine and verticilline, they do not seem to be entirely identical with the latter, thus justifying the proposal of two new names: *peimine*,  $C_{19}H_{30}NO_2$ , m p 223° C,  $[\alpha]_D^{24} 0^\circ$ , and *perimine*,  $C_{18}H_{28}NO_2$ , m p 135° C,  $[\alpha]_D^{24} -62.5^\circ$ .

The present paper deals with the pharmacological effects of peimine and perimine. The hydrobromides of the two substances were employed in all experiments—peimine HBr melting at 288° C and perimine HBr at 292° C.

*A. In Frogs*—The action of both peimine and perimine is practically identical. In small frogs (20 to 21 Gm) doses of 5 to 10 mg of either substance injected into the lymph sac produced no toxic signs. When perfused through the inferior vena cava, a 0.1 per cent solution of peimine HBr rapidly caused slowing of heart rate, increase in systole and decrease in diastole, soon followed by almost complete

A-V block, as shown in Fig 2 The ventricle became so depressed that it contracted only at intervals, and gradually the amplitude grew very small A concentration of 1:5000 reacted in a similar but less effective manner (Fig 2) Periodicity was the ultimate feature The results with peimine are essentially the same

*B Toxicity*—By intravenous injection in mice of a 0.1 per cent solution of either peimine HBr or peiminine HBr, the minimal lethal dose was determined to be 9 mg per Kg for each, as summarized in Table I Violent tonic convulsions occurred before death Doses as small as 3 or 4 mg per Kg also caused convulsive movements which became more pronounced upon stimulation Those animals that survived showed no apparent injury when observed for 7 to 10 days

TABLE I—TOXICITY OF PEIMINE HBr AND PEIMININE HBr IN MICE BY INTRAVENOUS INJECTION (SOLUTION 0.1 PER CENT)

Drug	Dose Mg per Kg	Number of Mice Used	Number of Mice Died	Minimal Lethal Dose Mg per Kg
Peimine HBr	8	5	2	9
	9	5	3	
	10	5	4	
Peiminine HBr	8	5	1	9
	9	5	4	
	10	1	1	
	11	3	2	

In rats the toxicity, as tested with peimine HBr, is not so great, although convulsions were noticed with a dose of 5 mg per Kg, injected intravenously These animals completely recovered from an amount of 25 mg, but deaths began to occur with a dose of 35 mg per Kg No study was made with peiminine in rats

In rabbits, weakness in the legs, ataxia and tremulous movements occurred following a dose of 10 mg per Kg, given by vein, of either peimine or peiminine in the form of a hydrobromide

*C Other Effects*—Both peimine and peiminine as hydrobromides in the dosage of 10 or more mg produced a fall of blood pressure, with prompt recovery, in etherized cats The amplitude of the respiration diminished slightly as the blood pressure fell

In rabbits there was a moderate hyperglycemia following the intravenous administration of either peimine or peiminine Thus one animal had an increase of 71 mg of sugar per 100 cc of blood 45 minutes after the injection of 10 mg of peiminine HBr The maximal increase in another rabbit with 5 mg of peiminine HBr was 14 mg Peimine HBr caused a maximal rise of blood sugar of 23 mg per 100 cc of blood in a rabbit with a dose of 10 mg, 22 mg in another with a dose of 7.5 mg per Kg and 18 and 35 mg in two others with doses of 5 mg per Kg each

A concentration of 1:10,000 of peimine or peiminine HBr inhibited the movements of rabbits' isolated intestines, with gradual recovery

When applied locally a 1 per cent solution of either substance is slightly bitter to the taste, the action of peimine HBr being somewhat more pronounced No mydriasis or local anesthesia resulted when the same solution was dropped into rabbits' eyes Neither peimine nor peiminine stimulated the submaxillary and pancreatic secretions, or increased the urinary output (dogs)

## SUMMARY

The effects produced by peimine and peiminine are practically the same. When perfused through the inferior vena cava in frogs, they induce decrease in the heart rate, complete A-V block and periodicity. They cause a fall of blood pressure (cats), and inhibit the activity of isolated rabbits' intestines. There is a moderate hyperglycemic action in rabbits. The minimal lethal dose to white mice, by intravenous injection, of both peimine and peiminine, is 9 mg per Kg, death being preceded by tonic convulsions.

## BIBLIOGRAPHY

- (1) S C I I, *Pentsao Kung Mu* (1596), Chapter 13
- (2) G A Stuart, *Chinese Materia Medica*, American Presbyterian Mission Press Shanghai (1911) 178
- (3) *Botanical Nomenclature*, Commercial Press, Shanghai (1917), 474
- (4) S Yagi, *Kyoto Igaku Zasshi*, 10 (1913), 175
- (5) M Fukuda, *Sci Repts Tôhoku Imp Univ*, 18 (1929), 323
- (6) T Q Chou *Chinese J Physiol* 6 (1932) 265

## STUDIES IN PERCOLATION \*

## A ANOMALIES OBSERVED IN THE PERCOLATION OF CINCHONA

BY MILTON WRUBLE

As one of the first tests of the mechanism of percolation, it seemed desirable to learn something about the nature of the extraction as the menstruum passes down from stratum to stratum in the percolator. The ideal way to carry out this test experimentally on a percolator containing 1000 Gm of drug, would be to segment the drug in layers of 100 Gm and stop the tincture at the bottom of each segment. To carry out this idea practically it seemed unsatisfactory to devise a means giving even approximate results. Hence, in place of a single percolator, a number of percolators were used, each representing a hypothetical segment of the larger percolator as suggested above.

The unit adopted for the first test of this scheme was that of 100 Gm and the unit of percolate to be tested that of 100 cc. Inasmuch as 10 cc were to be removed from each percolate for the tests planned, it was necessary to charge the second percolator with 90 Gm of drug and to draw 90 cc of percolate, to charge the third percolator with 80 Gm of drug and to draw 80 cc of percolate, etc.

Cinchona was selected for this experiment, not only because its alkaloidal content could be determined quantitatively with a considerable degree of accuracy even in mere traces, but because this drug presented problems in connection with the keeping qualities of both tincture and fluidextract that were worth while investigating.

The drug in question was obtained from J L Hopkins & Co, in December 1930, in powdered form, approximately a No 20 powder.

*Experiment I*—The 100-Gm batch was moistened with 75 cc of 95 p c alcohol, and the other batches with equivalent amounts. Each such moistened batch was allowed to stand in a closed container for 6 hours before packing in the per-

\* Scientific Section A Ph A, Toronto meeting, 1932

colator After packing, maceration was allowed to take place for 24 hours before percolation was commenced In the case of the 100-Gm batch the drawing off of the percolate lasted approximately 200 minutes In other cases corresponding periods were allowed

As already indicated 10 cc of percolate were set aside in each case Of this reserved portion, 5 cc were allowed to evaporate spontaneously at room temperature until of constant weight in order to determine the amount of extractive The other 5 cc were used for density determination by means of a pycnometer and for alkaloidal assay The latter was carried out with modifications,<sup>1</sup> according to the U S P X process described under Fluidextract of Cinchona The results are herewith tabulated

Amt of Drug Gm	Rate of Percolation <sup>1</sup> Minutes	Sp. Gr 20°	Extractive		Total Alkaloids <sup>2</sup>	
			Wt Gm	Per Cent	Wt Gm	Per Cent
100	200	0.852	0.59	13.8	0.02	0.59
90	180	0.864	0.75	17.3	0.01	0.29
80	160	0.876	0.89	20.3	0.008	0.23
70	140	0.876	0.97	22.2	0.01	0.29
60	120	0.866	0.81	18.7	0.02	0.59
50	100	0.856	0.64	14.9	0.02	0.59

<sup>1</sup> The rate was set as close to ten drops per minute as was possible and from time to time this rate had to be increased or decreased to this figure

<sup>2</sup> No alkaloidal assay on this bark was made

*Experiment IIa*—A second series of percolators was started, this time using ten and following out the same general scheme as in the first set of experiments In each case the material was macerated for twenty-four hours in the percolator before the actual percolation, as before

The results are tabulated as follows

Amt of Drug Gm	Rate <sup>1</sup> Minutes	Sp. Gr 20°	Extractive		Total Alkaloids	
			Wt Gm	Per Cent	Wt Gm	Per Cent
100	200	0.835	0.45	10.7	0.03	0.89
90	180	0.856	0.64	14.9	0.02	0.58
80	160	0.863	0.80	18.5	0.02	0.57
70	140	0.884	0.90	20.4	0.02	0.56
60	120	0.880	0.87	19.7	0.02	0.57
50	100	0.868	0.86	19.8	0.03	0.86
40	80	0.866	0.84	18.9	0.07	2.02
30	60	0.885	0.80	18.2	0.05	1.41
20	40	0.887	0.87	19.6	0.06	1.41
10	20	0.863	0.58	13.4	0.06	1.73

<sup>1</sup> The rate was set as close to ten drops per minute as was possible Invariably the rate slowed down and required frequent attention In the case of the 100 Gm and 90 Gm percolators the percolation stopped several times unexpectedly hence the time in these two cases is approximate

*Experiment IIb*—Extraction was resumed September 24th on the same set of percolators used in Experiment IIa after they had been corked and left standing since June 14th The same general scheme was followed out in this case as before The results are tabulated as follows

<sup>1</sup> No absorbent material was used but the alcoholic extract added directly to the ether chloroform mixture

Amt of Drug, Gm	Rate Hours	Sp Gr 20°	Wt Gm	Extractive <sup>1</sup> Per Cent	Wt Gm	Total Alkaloids <sup>2</sup> Per Cent
100	18 1/2	0 796	0 15	3 7	0 02	0 63
90	18	0 803	0 30	7 4	0 03	0 93 <sup>3</sup>
80	12 1/2	0 814	0 31	7 6	0 04	1 22
70	11 1/4	0 828	0 39	9 4	0 055	1 66
60	9 1/4	0 820	0 44	10 7	0 05	1 52
50	6 3/4	0 830	0 46	11 0	0 05	1 50
40	4	0 810	0 55	13 0	0 06	1 64
30	3 1/4	0 828	0 45	10 8	0 05	1 50
20	2 3/4	0 825	0 37	8 9	0 04	1 21
10	2	0 822	0 47	11 4	0 03	0 91

<sup>1</sup> U S P X method for total extractive page 466

<sup>2</sup> U S P X method for total alkaloids page 453

<sup>3</sup> No doubt the increases in these alkaloidal contents are due to the maceration period which intervened

*Experiment III*—The same scheme as had been carried out with the smaller quantities was now extended to larger quantities of drug<sup>1</sup> In the first percolator 1000 Gm of drug were used, in the second 900 Gm and so on to the tenth percolator containing 100 Gm From the percolator containing 1000 Gm, 1000 cc of tincture were collected, 100 cc of this amount were reserved and the 900 cc of the remaining tincture used in percolating the next batch containing 900 Gm of drug This was repeated throughout just as was done in the earlier experiments Ten such series of experiments were made and the determinations carried out as outlined in the U S P X

*p<sub>H</sub>* determinations were attempted with the use of the quinhydrone electrode in conjunction with a Leeds and Northrup potentiometer set-up Because of the high alcoholic content of the solutions these values are not to be relied upon<sup>2</sup> The results of ten such series of extractions are herewith tabulated

SERIES I							
Amt of Drug, Gm	<i>p<sub>H</sub></i> <sup>1</sup>	Rate Hours	Sp Gr 20°	Wt Gm	Extractive <sup>2</sup> Per Cent	Alkaloidal Content <sup>3</sup> Wt Gm	Per Cent
1000	3 72	78 3/4	0 8572	0 772	9 05	0 04	1 17
	3 27						
900	3 87	71 1/4	0 8699	1 03	11 09	0 54	1 59
	3 52						
800	4 22	61 1/4	0 8703	1 10	12 50	0 55	1 58
	3 44						
700	3 98	52 3/4	0 8725	1 14	13 00	0 56	1 63
	3 28						
600	3 75	48 1/2	0 8787	1 27	14 50	0 58	1 63
	3 32						
500	3 69	41	0 8685	1 14	13 20	0 53	1 54
	3 32						
400	3 80	34 3/4	0 8691	1 07	12 40	0 53	1 53
	3 77						
300	3 78	22 1/2	0 8691	1 07	12 65	0 48	1 41
	3 73						

<sup>1</sup> Received from J L Hopkins & Co in 1931, No 20 powder, alkaloidal assay 4 70 p c 4 32 p c and 4 26 p c of total alkaloids in as many assays (U S P X)

<sup>2</sup> It is possible that the apparatus did not admit of the sensitivity that should be required when working under such conditions

200	4 12 3 73	13 <sup>1</sup> / <sub>4</sub>	0 8681	1 14	13 24	0 52	1 50
100	4 26 3 80	7 <sup>3</sup> / <sub>4</sub>	0 8761	1 38	15 80	0 61	1 74

<sup>1</sup> The second figures in the  $p_H$  column were obtained 72 hours after the first readings were taken

- The total extractive was determined by drying in an oven exactly as outlined in the U S P X and not as was carried out in earlier experiments Alkaloidal determinations were also made according to U S P X methods

#### SERIES II

Amt of Drug Gm	$p_H$	Rate Hours	Sp. Gr 20°	Wt Gm	Extractive Per Cent	Alkaloidal Wt Gm	Content Per Cent
1000	3 80 3 15	77 <sup>1</sup> / <sub>4</sub>	0 9320	0 310	3 72	0 02	0 60
900	3 90 3 12	72 <sup>1</sup> / <sub>4</sub>	0 8555	0 714	8 35	0 031	0 91
800	4 24 3 65	62 <sup>3</sup> / <sub>4</sub>	0 8613	0 926	10 67	0 045	1 33
700	4 22 3 73	50 <sup>1</sup> / <sub>2</sub>	0 8612	0 911	10 60	0 042	1 24
600	3 92 3 46	47 <sup>1</sup> / <sub>2</sub>	0 8616	0 878	10 11	0 035	1 02
500	3 95 3 35	37 <sup>3</sup> / <sub>4</sub>	0 8519	0 749	8 75	0 027	0 79
400	3 95 3 25	32 <sup>1</sup> / <sub>4</sub>	0 8489	0 685	8 10	0 024	0 71
300	4 02 3 31	24	0 8508	0 743	8 75	0 031	0 93
200	4 15 3 31	10 <sup>3</sup> / <sub>4</sub>	0 8549	0 803	9 40	0 028	0 82
100	4 02 3 22	6 <sup>1</sup> / <sub>2</sub>	0 8555	0 793	9 30	0 034	0 01

#### SERIES III

Amt of Drug Gm	$p_H$	Rate Hours	Sp. Gr 20°	Wt Gm	Extractive Per Cent	Alkaloidal Wt Gm	Content Per Cent
1000	4 20 3 87	76 <sup>1</sup> / <sub>4</sub>	0 8177	0 167	2 05	0 013	0 39
900	3 72 3 73	70	0 8240	0 256	3 10	0 020	0 62
800	3 97 4 05	58 <sup>1</sup> / <sub>4</sub>	0 8339	0 437	5 23	0 027	0 81
700	4 04 4 10	51 <sup>1</sup> / <sub>4</sub>	0 8335	0 491	5 88	0 033	0 99
600	4 17 3 82	42 <sup>1</sup> / <sub>2</sub>	0 8379	0 414	5 95	0 023	0 69
500	3 93 3 68	38 <sup>1</sup> / <sub>4</sub>	0 8387	0 512	6 12	0 026	0 78
400	3 76 3 40	30 <sup>3</sup> / <sub>4</sub>	0 8334	0 426	5 12	0 038	0 84
300	3 67 3 58	22 <sup>1</sup> / <sub>2</sub>	0 8329	0 394	4 72	0 021	0 65
200	3 72 3 47	14 <sup>1</sup> / <sub>4</sub>	0 8335	0 434	5 20	0 022	0 68
100	4 21 3 96	8 <sup>1</sup> / <sub>4</sub>	0 8349	0 574	6 87	0 025	0 76

## SERIES IV

Amt of Drug Gm	pH	Rate Hours	Sp Gr 20°	Wt Gm	Extractive Per Cent	Alkaloidal Content Wt Gm	Content Per Cent
1000	3 78	58 <sup>1</sup> / <sub>4</sub>	0 8167	0 124	1 52	0 010	0 30
	3 74						
900	3 53	49 <sup>1</sup> / <sub>2</sub>	0 8217	0 234	2 84	0 015	0 47
	3 57						
800	3 53	44 <sup>1</sup> / <sub>2</sub>	0 8312	0 372	4 46	0 023	0 69
	3 20						
700	3 63	40	0 8337	0 432	5 10	0 021	0 65
	3 20						
600	3 35	37 <sup>1</sup> / <sub>4</sub>	0 8347	1		0 025	0 76
	3 57						
500	3 36	34 <sup>1</sup> / <sub>2</sub>	0 8368	0 493	5 90	0 034	0 77
	3 15						
400	3 18	28 <sup>1</sup> / <sub>2</sub>	0 8368	0 477	5 70	0 025	0 79
	3 07						
300	3 22	23 <sup>1</sup> / <sub>4</sub>	0 8323	0 385	4 74	0 024	0 72
	3 10						
200	3 15	16 <sup>1</sup> / <sub>4</sub>	0 8307	0 391	4 72	0 023	0 70
	3 48						
100	3 47	9	0 8412	0 582	6 90	0 027	0 80
	3 48						

<sup>1</sup> Sample lost

## SERIES V

Amt of Drug Gm	pH	Rate Hours	Sp Gr 20°	Wt Gm	Extractive Per Cent	Alkaloidal Content Wt Gm	Content Per Cent
1000	3 58	50 <sup>1</sup> / <sub>2</sub>	0 8148	0 095	1 16	0 013	0 41
	3 52						
900	3 29	44 <sup>1</sup> / <sub>4</sub>	0 8210	0 164	2 01	0 015	0 47
	3 56						
800	3 14	41 <sup>1</sup> / <sub>2</sub>	0 8267	0 273	3 32	0 025	0 77
	3 93						
700	3 22	39 <sup>1</sup> / <sub>4</sub>	0 8320	0 387	4 64	0 026	0 79
	3 88						
600	3 54	36 <sup>1</sup> / <sub>2</sub>	0 8344	0 453	5 42	0 020	0 61
	3 85						
500	3 34	34 <sup>1</sup> / <sub>2</sub>	0 8371	0 493	5 88	0 020	0 61
	3 68						
400	3 44	26 <sup>1</sup> / <sub>4</sub>	0 8371	0 514	6 15	0 032	0 97
	3 87						
300	3 23	22 <sup>1</sup> / <sub>4</sub>	0 8336	0 450	5 40	0 021	0 64
	3 77						
200	3 26	14 <sup>1</sup> / <sub>4</sub>	0 8325	0 407	4 88	0 017	0 51
	3 62						
100	3 42	8 <sup>1</sup> / <sub>2</sub>	0 8353	0 472	5 65	0 025	0 76
	3 75						

## SERIES VI

Amt of Drug Gm	pH	Rate Hours	Sp Gr 20°	Wt Gm	Extractive Per Cent	Alkaloidal Content Wt Gm	Content Per Cent
1000	3 87	53	0 8131	0 075	0 93	0 009	0 29
	4 10						
900	3 67	47 <sup>1</sup> / <sub>2</sub>	0 8169	0 140	1 70	0 010	0 31
	4 10						



800	3 52	44 <sup>1</sup> / <sub>2</sub>	0 8253	0 235	2 85	0 016	0 48
	4 23						
700	3 26	41	0 8303	0 382	4 60	0 023	0 54
	4 55						
600	3 34	36 <sup>1</sup> / <sub>4</sub>	0 8349	0 452	5 42	0 021	0 64
	3 07						
500	3 28	32 <sup>3</sup> / <sub>4</sub>	0 8367	0 477	5 70	0 022	0 66
	3 32						
400	3 38	27 <sup>1</sup> / <sub>4</sub>	0 8364	0 531	6 35	0 023	0 71
	3 35						
300	4 13	23 <sup>3</sup> / <sub>4</sub>	0 8345	0 470	5 62	0 023	0 70
	3 35						
200	3 55	17 <sup>3</sup> / <sub>4</sub>	0 8343	0 478	5 72	0 022	0 67
	3 75						
100	3 61	8 <sup>1</sup> / <sub>4</sub>	0 8336	0 425	5 10	0 023	0 69
	3 87						

## SERIES VII

Amt of Drug Gm	p <sub>H</sub>	Rate Hours	Sp Gr 20°	Wt Gm	Extractive Per Cent	Alkaloidal Wt Gm	Content Per Cent
1000	3 32	52 <sup>1</sup> / <sub>2</sub>	0 8096	0 058	0 72	0 008	0 24
	3 67						
900	3 28	45 <sup>1</sup> / <sub>2</sub>	0 8145	0 119	1 46	0 012	0 37
	3 80						
800	2 98	43	0 8188	0 197	2 40	0 016	0 59
	3 87						
700	3 00	41 <sup>3</sup> / <sub>4</sub>	0 8242	0 300	3 63	0 020	0 62
	3 62						
600	3 45	37 <sup>1</sup> / <sub>4</sub>	0 8296	0 427	5 18	0 024	0 72
	3 47						
500	3 23	34 <sup>1</sup> / <sub>4</sub>	0 8320	0 463	5 45	0 026	0 78
	3 65						
400	3 26	25 <sup>3</sup> / <sub>4</sub>	0 8345	0 521	6 25	0 027	0 81
	3 42						
300	3 22	22 <sup>1</sup> / <sub>2</sub>	0 8336	0 512	6 15	0 027	0 82
	3 50						
200	3 42	19 <sup>1</sup> / <sub>4</sub>	0 8298	0 428	5 12	0 026	0 79
	3 38						
100	3 49	7 <sup>3</sup> / <sub>4</sub>	0 8318	0 457	5 50	0 028	0 86
	3 43						

## SERIES VIII

Amt of Drug Gm	Rate Hours	Sp Gr 20°	Wt Gm	Extractive Per Cent	Alkaloidal Wt Gm	Content Per Cent
1000	50 <sup>3</sup> / <sub>4</sub>	0 8098	0 043	0 54	0 008	0 24
		0 8138	0 115	1 42	0 017	0 32
900	44 <sup>1</sup> / <sub>2</sub>	0 8175	0 183	2 23	0 0125	0 38
800	41 <sup>1</sup> / <sub>2</sub>	0 8226	0 275	3 33	0 0200	0 60
700	37 <sup>1</sup> / <sub>2</sub>	0 8302	0 415	5 00	0 022	0 68
600	34 <sup>1</sup> / <sub>4</sub>	0 8321	0 483	5 80	0 025	0 74
500	30	0 8346	0 570	6 82	0 027	0 82
400	27 <sup>1</sup> / <sub>4</sub>	0 8352	0 565	6 70	0 022	0 67
300	23 <sup>1</sup> / <sub>2</sub>	0 8342	0 535	6 40	0 026	0 79
200	18 <sup>1</sup> / <sub>4</sub>	0 8386	0 584	7 00	0 028	0 83
100	8 <sup>1</sup> / <sub>2</sub>					

## SERIES IX

Amt of Drug Gm	Rate Hours	Sp. Gr 20°	Extractive		Alkaloidal Content	
			Wt Gm	Per Cent	Wt Gm	Per Cent
1000	44 <sup>1</sup>	0.8183	0.038	0.47	0.008	0.24
900	41 <sup>1</sup> / <sub>4</sub>	0.8198	0.075	0.92	0.0085	0.26
800	37 <sup>1</sup> / <sub>4</sub>	0.8220	0.1345	1.63	0.0130	0.39
700	34	0.8268	0.209	2.53	0.0190	0.59
600	32 <sup>1</sup> / <sub>2</sub>	0.8298	0.282	3.30	0.022	0.66
500	31 <sup>1</sup> / <sub>4</sub>	0.8373	0.408	4.87	0.024	0.72
400	26 <sup>3</sup> / <sub>4</sub>	0.8414	0.484	5.72	0.025	0.75
300	21 <sup>1</sup> / <sub>2</sub>	0.8519	0.736	8.65	0.031	0.90
200	11 <sup>1</sup> / <sub>2</sub>	0.8706	0.890	9.30	0.031	0.90
100	6	0.8598	0.763	8.90	0.029	0.86

SERIES X<sup>1</sup>

Amt of Drug Gm	Rate Hours	Sp. Gr 20°	Extractive		Alkaloidal Content	
			Wt Gm	Per Cent	Wt Gm	Per Cent
1000	46 <sup>1</sup> / <sub>2</sub>	0.8162	0.038	0.46	0.006	0.18
900	40	0.8171	0.075	0.90	0.012	0.28
800	37 <sup>3</sup> / <sub>4</sub>	0.8213	0.119	1.44	0.016	0.48
700	33	0.8239	0.187	2.23	0.017	0.50
600	31 <sup>1</sup> / <sub>2</sub>	0.8224	0.190	2.32	0.013	0.39
500	27 <sup>3</sup> / <sub>4</sub>	0.8323	0.321	3.85	0.040	0.49
400	25 <sup>1</sup> / <sub>2</sub>	0.8310	0.355	4.26	0.022	0.66
300	20	0.8406	0.548	6.62	0.026	0.79
200	10 <sup>3</sup> / <sub>4</sub>	0.8403	0.472	5.62	0.016	0.47
100	7 <sup>1</sup> / <sub>4</sub>	0.8373	0.479	5.72	0.021	0.62

<sup>1</sup> The ninth and tenth series in these experiments were run after an approximately three-month period of rest

*Discussion*—From these many results it is to be noted that certain anomalies are present. In every series the maximum point is reached followed by a decrease. Such results are not readily explainable. No doubt, however, certain surface phenomena, such as adsorption, absorption and perhaps others of which we know little, are responsible in a great measure for this anomaly.

*Errors*—These experiments presented a number of difficulties in technique some of which were only realized during the procedure. It must be admitted that at their best they represent only an approach to ideal conditions. While as many of the variables in percolation were controlled as nearly as possible to be identical in each of the ten percolators, it was found quite impossible to maintain them at comparative rates of flow for any length of time. The rates would generally decrease after being adjusted, sometimes increase and in a number of instances stop flowing altogether.

Where the rate decreased it was adjusted to run faster so that the final volumes in all percolators would be collected at comparative rates and if it increased the percolator was allowed to run slower in like manner. If a percolator stopped and was not noticed soon thereafter (this did not occur frequently), the rate at which it was set was determined by the judgment developed in carrying out the rather large number of extractions.

Percolators were started at approximately the same time each morning and stopped at a fixed time every day. Experimentation was not interrupted at any

other time but was carried out seven days a week. Here again, the ideal manner of conducting such extractions would have been to continue percolation from the very beginning without a single interruption. While we may assume that the intervening maceration periods, having been the same in each case would tend to equalize this error, it must not be forgotten that during these macerations numerous changes took place. (See Series IX and X.)

Throughout the many months in which these experiments were conducted the changes in temperature<sup>1</sup> must have affected the solubility of the constituents more or less. Some of the latter series were made in the warmer months of the year, the earlier in the fall months while those in between during the winter months. The room temperature during these various periods of the year must of necessity have varied somewhat.

In spite of the errors that have been enumerated it is believed that inasmuch as the large number of extractions made show strikingly the repetition that has already been pointed out, we can feel justified in believing that such an anomaly exists in the case of cinchona.

It was only after the experimental results had been tabulated that Searby's discussion of Seifert's paper on "interrupted" percolation (*Proc Cal Pharm Soc*, 22 (1892), 125) came to the notice of the writer. When a year ago the anomalies observed were discussed with Professor Wilbur Scoville and Dr F O Taylor of Parke, Davis & Co, both stated that they had observed them in factory practice. Inasmuch as their observations have not been published, hence their data are not available, it seemed best to complete the series of experiments recorded above and to report in detail. No one appears to have attempted an explanation of these anomalies thus far. It certainly is imperative that they be given due consideration even though they complicate a situation already sufficiently difficult of understanding.

#### WISCONSIN PHARMACEUTICAL EXPERIMENT STATION

<sup>1</sup> Goris who has recently made a comprehensive theoretical analysis of percolation states in this connection. "*Il est surtout important au cours d'une lixiviation, d'éviter les changements de température*" (*Bull des Sciences Pharmcol* 26 (1919), 477)

#### STRYCHNINE POISONING

M C Wheelock (*J A M A*, 99 (1932), 1862) reports on a case of attempted suicide in which probably about 1 grain of strychnine sulphate was taken as recorded in which the patient ultimately recovered under prompt treatment with sodium phenobarbital and sodium amytal. The immediate treatment, twenty minutes after the first seizure, was the administration of 5 grains of phenobarbital by hypodermic injection. Subsequent to this any attempt to move the patient caused violent convulsions. 5 grains more sodium barbital was then injected by vein but without complete relief. Therefore, 15 grains of sodium amytal, dissolved in 10 cc of water was in-

jected intravenously at the rate of 1 cc a minute. The patient was sound asleep in ten minutes and could then be moved to bed. There were only slight spasms during the subsequent day. Further treatment consisted in the administration of the three bromides. Subsequently recovery was uneventful. No attempt was made to wash the stomach. The antidotal action of phenobarbital sodium on experimental strychnine poisoning in animals has been recorded previously, but no case of its use for this purpose in man has been recorded. In this one case the results were so dramatic as to suggest that the remedy should at least be tried when needed.—Through *Quarterly Journal of Pharmacy*

# BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

## APPARATUS AND MANIPULATIONS

Anon  
Rapid suppository press  
*Pharm Zentralh* , 74 (1933), 321  
Dultz, G  
Testing of glass ampuls  
*Pharm Ztg* , 78 (1933), 482  
Haas, Karl  
A homeopathic measuring glass  
*Pharm Acta Helv* , 8 (1933) 90  
Malmy, M  
A new microburette  
*J pharm chim* 17 (1933) 469  
Wruble, Milton  
Studies in percolation  
*Am J Pharm* , 105 (1933) 289

## PHARMACOPŒIAS AND FORMULARIES

Linnell, Wilfred H  
Pharmaceutical Chemistry and the B P , 1932  
VIII & IX  
*Pharm J* , 130 (1933), 466, 558

## PHARMACEUTICAL PREPARATIONS

Bonde, W  
Sterilization of sodium bicarbonate solution  
*Pharm Zentralh* , 74 (1933), 285  
Bordeianu, C V  
Mercury oxycyanide pastilles  
*Arch Pharm* , 271 (1933), 149  
Gore L F  
Tincture of hyoscyamus  
*Pharm J* , 130 (1933) 483  
Gsturner F , and Rosenthal, K  
Seldom used tinctures IV  
*Pharm Zentralh* 74 (1933), 361  
Husa, William J , and Birmingham George W  
Stability of solution of iron and ammonium acetate, U S P X  
*Jour A Ph A* , 22 (1933), 495  
Kroeber, Ludwig  
Study of fluidextract of peony root  
*Pharm Zentralh* , 74 (1933), 367

Morton, C  
Composition of Fowler's solution  
*Quart J Pharm & Pharmacol* , 6 (1933), 1  
Poethike, W  
Theory of galemic preparations Emulsions  
*Pharm Zentralh* , 74 (1933), 313  
Reinicke, Hans  
Diacolution and comparative assays of fluid-extract of senega  
*Pharm Ztg* , 78 (1933), 563  
Schneider, Wolfgang  
Preparation and storage of tincture and extract of nux vomica  
*Apoth-Ztg* , 48 (1933), 655  
Schou, Aage, and Staggemeier, Otto Mogens  
Studies on medicines for injection VI  
Tutocaine and Iarocaine  
*Dansk Tids Farm* , 5 (1933), 106  
Schroff, E  
Preparation of tablets  
*Pharm Ztg* , 78 (1933), 471, 480  
Sidi, Edwin, and Dreyfus, A G  
New preparation for intravenous sclerosing injections  
*Presse med* , 40 (1932), 764, through *Chem Abstr* , 27 (1933), 2759

## PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Borovsky, Maxwell P , and Steigmann, Frederick  
Amidopyrine in the treatment of measles  
*J A M A* , 100 (1933), 1859  
Chen K K , et al  
Amyl nitrite and cyanide poisoning  
*J A M A* , 100 (1933), 1920  
Epstein, David  
Action of plasmoquine on the uterus  
*Quart J Pharm & Pharmacol* , 6 (1933) 5  
Franburg, S J  
Dermatitis due to nupercaine  
*J A M A* , 101 (1933), 30  
Genin, G  
Lecithin in dermatology  
*Parfum Mod* (April 1933), 181, through  
*Pharm J* , 130 (1933), 538

- Gower W E and Van De Erve J  
Recovery from experimental barbital poisoning under various types of fluid administration  
*J Pharmacol & Exper Therap*, 48 (1933), 141  
Hemmingsen Axel Marius  
Accuracy of insulin assay on white mice Part I  
*Quart J Pharm & Pharmacol*, 6 (1933), 39  
Hemmingsen, Axel M, and Marks H P  
Influence of experimental temperature on assay of insulin by the mouse method  
*Quart J Pharm & Pharmacol*, 6 (1933), 81  
Jensen, Vilh, and Jensen, Elsa  
Determination of the phenol coefficient of disinfectants by the "cover glass method"  
*Dansk Tids Farm*, 5 (1933), 77  
Lehman, A J, and Hanzlik P J  
Comparative potency of some digitalis specialties according to the pigeon method  
*J Pharmacol & Exper Therap*, 48 (1933), 151  
Lauter W M, *et al*  
Studies on the preparation, toxicity and absorption of bismuth compounds V  
*Jour A Ph A*, 22 (1933) 531  
Myers, G Norman  
Substitutes for morphine and heroin  
*Brit Med J* (June 3, 1933), 981  
Rapps, Norman Frank  
Bactericidal efficiency of chlorocresol and chloroxylenol  
*J Soc Chem Ind*, 52 (1933) 175T  
Regnier, Jean, *et al*  
Loss of anesthetic power of cocaine solutions on heating and on prolonged storage  
*Bull sci pharmacol*, 40 (1933), 271  
Sivadjian J  
Relationship between the speed of passage of local anesthetics through lipid membranes and their anesthetic value  
*J pharm chim*, 17 (1933) 361  
Sivadjian J  
Study of the passage of substances through lipid membranes  
*J pharm chim*, 17 (1933), 457  
Thompson, Marvin R, *et al*  
Pharmacological activity of chemically assayed Spirit of Ethyl Nitrite  
*Jour A Ph A*, 22 (1933) 487  
Tramasure, Maurice  
Comparative activity of natural and artificial vitamins  
*J pharm Belg* 15 (1933), 407, 423
- BOTANY AND PHARMACOGNOSY
- Jois, H S *et al*  
Chemical examination of the seeds of *Psoralea corylifolia* (Linn)  
*J Indian Chem Soc*, 10 (1933), 41, through  
*Chem Abstr* 27 (1933) 3030  
Jones Ivor, and Lynn, E V  
Differences in species of *Taxus*  
*Jour A Ph A*, 22 (1933), 528  
Kondo, Y  
Studies on the identification of drugs by means of the appearance of the ash IV  
*J Pharm Soc Japan*, No 615 (1933), 71  
Krishna, S and Varma B S  
Indian artemisias  
*Quart J Pharm & Pharmacol* 6 (1933) 23  
Kroeber, Ludwig  
New drug adulterations  
*Apoth Ztg*, 48 (1933) 669  
Langecker, Hedwig  
Adsorption power of charcoals of animal and vegetable origin  
*Pharm Zentralh*, 74 (1933) 274  
Manchey, L Lavan  
Phytochemical study of *Gillenla Stipulata*  
*Jour A Ph A*, 22 (1933) 520  
Mayers M A  
Acid-soluble oxidizing material from charcoal  
*J Am Chem Soc* 55 (1933), 2435  
Niemann E  
Investigation of the possibility of using the flowers of colchicum instead of the seed  
*Pharm Acta Helv* 8 (1933) 90  
Rabate, J  
A phytochemical review of the anthocyanides  
*J pharm chim*, 17 (1933) 433 474  
Samann, Karam  
Constituents of "Ammi Visnaga"  
*Quart J Pharm & Pharmacol*, 6 (1933), 13  
Tukats A  
Studies in the cultivation of rhubarb in Szeged  
*Pharm Acta Helv*, 8 (1933) 61
- ALKALOIDS AND GLUCOSIDES
- Barthen, Alfred *et al*  
Study of some incompatibilities of quinine sulphate  
*Jour A Ph A*, 22 (1933) 534  
Brill H C and Bulow, T A  
Alkamine esters of fatty acids Novocaine analogs IV  
*J Am Chem Soc*, 55 (1933), 2059  
Casparis P, and Feorier, Ch  
Saponins of *Orthosiphon stamineus*  
*Pharm Acta Helv* 8 (1933) 72  
Chou T Q  
Alkaloids of Chinese *Corydalis ambigua* (Yen-hu-so) IV  
*Chinese J Physiol* 7 (1933) 35, through  
*Chem Abstr*, 27 (1933) 3033

Chou, I Q

Alkaloids of *Fritillaria royeri* (pei-mu)

*Chinese J Physiol*, 7 (1933), 41, through  
*Chem Abstr* 27 (1933), 3033

Duquenois, P

Some reactions for differentiating between  
novocaine and panthesine

*Bull sci pharmacol*, 40 (1933) 287

Huins, John

Hydrolytic scission of alkaloids

*Pharm Presse Wiss prakt Heft*, 38 (1933) 51

Hester, Earl E, and Davy, Edward D

Alkaloids of *Datura Innoxia*, Miller

*JOUR A PH A*, 22 (1933), 514

Mascré, M, and Pousset, M

Action of chloroform, ether and benzene  
vapors on the glucosidal constituents of the  
leaves of *Aucuba japonica*

*Bull sci pharmacol*, 40 (1933), 257

Offerhaus, C, and Baert, C G

Anesthetics, particularly cocaine and novocaine

*Pharm Weekbl* 70 (1933) 506 526

Pyriki, Constantin

Determination of nicotine in tobacco

*Pharm Zentralh*, 74 (1933) 253

Rosenthaler, L

Identification of organic compounds XI  
Pantocaine

*Pharm Ztg*, 78 (1933) 543

Van Zijp, C

Micro-optical differences in cocaine hydro-  
chloride and novocaine

*Pharm Weekbl*, 70 (1933), 607

von Miko, Julius

Caffeine content of tincture of cola

*Pharm Zentralh* 74 (1933) 301

## ESSENTIAL OILS

Brandrup, W

Detection of colophony and balsam of Tolu

*Pharm Ztg*, 78 (1933) 497

Freise Fred W

Brazilian species of *chenopodium* yielding  
essential oils

*Perf & Ess Oil Rec*, 24 (1933), 88 through  
*Chem Abstr* 27 (1933), 3031

## OILS FATS AND WAXES

Baud, A

Examination of olive oil with Wood's light

*Pharm Acta Helv*, 8 (1933), 83

Canals, E and Ramahenina Ranaivo

Surface tension of oils

*J pharm chim*, 17 (1933), 505

Roy, Madeleine

Rotary power of castor oil and changes due to  
prolonged heating

*J pharm chim*, 17 (1933), 373

## ANALYTICAL METHODS AND RESULTS

Beal George D, and Szalkowski, Chester R

Determination of chloroform

*JOUR A PH A*, 22 (1933), 540

Grove, Donald C, and Hoshall, Edward M

Assay methods for some N F VI preparations  
containing bromides

*JOUR A PH A*, 22 (1933), 545

Janot, M, and Estève, Ch

Gravimetric determination of santonin in  
santonica

*Bull sci pharmacol*, 40 (1933) 230

Kallstrom, E

Bromometric determination of sympatol, p-  
oxyphenylethanolmethyl-amine tartrate

*Pharm Zentralh*, 74 (1933), 269

Kolthoff, I M, and Yutzy, H

Nephelometric determination of chloride

*J Am Chem Soc*, 55 (1933), 1915

Lewis, B, et al

Spectroscopic study and assay of histamine

*J Am Chem Soc*, 55 (1933) 2025

Munro A C and Seifert R

Estimation of pepsin

*Pharm J* 130 (1933), 482

Ralls, J O

Factors causing abnormal iodine absorption  
number of cholesterol

*J Am Chem Soc*, 55 (1933), 2083

Rhodes T F, and Cofman, Victor

Identification of thyroid tablets

*Pharm J* 130 (1933), 459

Rosenthaler, L

Analytical notes II and III

*Pharm Zentralh*, 74 (1933), 288, 333

Volmar M Y, and Leber M

Picrolonic acid as a reagent for alkali metals

*J pharm chim* 17 (1933) 366 427

Raquet D, and Pinté, P

Volumetric determination of iodide in the  
presence of bicarbonates, borates and  
alkaline acetates

*J pharm chim*, 17 (1933), 508

Wagenaar, M

Contribution to the identification of salvarsan

*Pharm Weekbl*, 70 (1933), 597

## INORGANIC AND PHYSICAL CHEMISTRY

Baxter G P, and Shaefer, W E

Revision of the atomic weight of arsenic

*J Am Chem Soc*, 55 (1933), 1957  
 Baxter, G P, and Thomas J S  
 Revision of the atomic weight of thallium  
*J Am Chem Soc*, 55 (1933) 2384  
 Serrallach J A, *et al*  
 Strength of emulsifier films at liquid interfaces  
*Ind Eng Chem*, 25 (1933), 816  
 Wallrabe Gottfried, and Schartner Helmut  
 Talcum, D A B 6  
*Apoth-Ztg*, 48 (1933), 571  
 Pauling L  
 Formulas of antimonie acid and the anti-  
 monates  
*J Am Chem Soc*, 55 (1933), 1895

### ORGANIC CHEMISTRY

Chechik Samuel R  
 Brom derivatives of hydrothymoquinone  
*Jour A Ph A*, 22 (1933), 506

Fleury, Paul, and Lange, Jacques  
 Action of periodic acid on sugars  
*J pharm chim*, 17 (1933), 409  
 Hunter, W H, and Budrow, T T  
 Iodination of phenol under anhydrous con-  
 ditions  
*J Am Chem Soc*, 55 (1933), 2122  
 Levin, D E, and Lowy, A  
 Derivatives of dihydroeugenol and some of  
 their pharmacological properties  
*J Am Chem Soc*, 55 (1933), 1995  
 Olsen Aksel, G  
 Pectin studies  
*Ind Eng Chem* 25 (1933), 699  
 Roark, R C  
 Rotenone  
*Ind Eng Chem* 25 (1933) 639  
 Verda, A  
 Chemical nature of vitamins  
*Pharm Acta Helv*, 8 (1933), 80

### WHAT IS A PROFESSION?

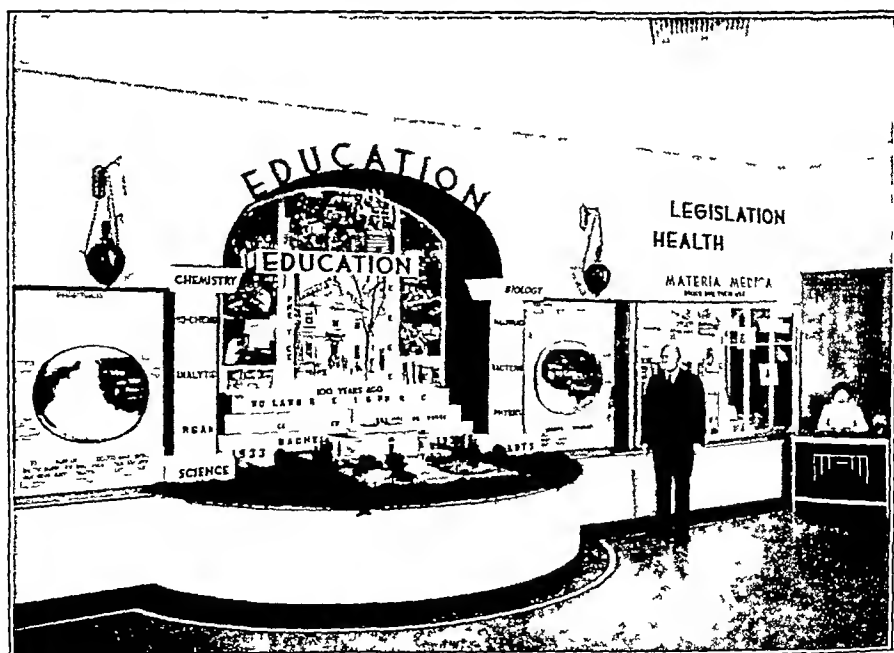
Justice Brandeis of the United States Su-  
 preme Court, is credited with this definition of a  
 profession

'First a profession is an occupation for  
 which the necessary preliminary training is in-  
 tellectual in character involving knowledge,

and to some extent learning, as distinguished  
 from mere skill

'Second, it is an occupation which is pursued  
 largely for others and not merely for one's self

'Third, it is an occupation in which the  
 amount of financial return is not the accepted  
 measure of success "



View of the Education Display and the story of the evolution of Materia Medica during the past hundred years—Pharmacy Exhibit, Chicago World's Fair

## ASSAY OF GLYCERITE OF BISMUTH \*

BY JOSEPH L. MAYER

The National Formulary on page 109 gives the following method for the assay of Glycerite of Bismuth

'Dilute 5 cc of Glycerite of Bismuth, accurately measured, with 100 cc of distilled water, in a flask, add two drops of hydrochloric acid and pass a current of hydrogen sulphide through the solution until it is saturated. Allow the precipitate to settle and decant the supernatant liquid (which should be clear and colorless) through a Gooch crucible or filter, retaining the precipitate in the flask. Wash the precipitate a few times by decantation, then transfer it completely to the filter and wash with water until the washings give no test for chloride. Now wash twice with alcohol, then with warm carbon tetrachloride and again with alcohol. Dry at 100° C and weigh. The weight of bismuth sulphide multiplied by 0.903 represents its equivalent in  $\text{Bi}_2\text{O}_3$ .'

To avoid the use of hydrogen sulphide and the involved manipulation of this assay I have for a considerable number of years employed the following method for the quantitative determination of bismuth in glycerite of bismuth

Accurately measure 5 cc of Glycerite of Bismuth into a 400 cc beaker, add about 100 cc of water, heat to boiling, then add concentrated HCl until the precipitate which at first forms redissolves and then add ammonia water until a turbidity is produced, after which sufficient concentrated HCl is added to clear up the turbidity, to this boiling solution add an excess (about 50 cc should be sufficient) of ten per cent ammonium phosphate solution, drop by drop from a 50-cc pipette. Allow to settle and filter the precipitate on a Gooch crucible and wash with hot water until free from chlorides and after drying crucible and contents, place in a nickel crucible and heat until the weight is constant.

Multiply the weight of the precipitate by 0.7663 and then by 20, the result will be the grams of  $\text{Bi}_2\text{O}_3$  in 100 cc of sample.

The method is accurate, rapid, easily carried out and has everything to commend it.

RESEARCH AND ANALYTICAL LABORATORY,  
LOUIS K. LIGGETT COMPANY,  
NEW YORK, N. Y.

## DETERMINATION OF SPECIFIC GRAVITY OF PARAFFIN †

BY BERL S. ALSTODT

The U. S. P. under *Paraffinum* says the specific gravity is about 0.900 at 25° C, but specifies no method for its determination.

Under *Cera Flava* the U. S. P. not only states the range of specific gravity, but also provides a definite method for its determination. Under *Cetaceum* the Pharmacopœia states the range of specific gravity as 0.938 to 0.944 at 25° C when determined by the method given under *Cera Flava* using alcohol warmed to from 38° to 40° C.

In view of the foregoing, I determined the specific gravity of paraffin by the procedure recommended under *Cera Flava*, modifying the method by using alcohol warmed to from 42° to 45° C. For comparison I made several experiments to

\* Read before the New York Pharmaceutical Association meeting June 1933.

† New York State Pharmaceutical Association, 1933.



determine how this method and the commonly referred to "sinker method" agreed. The results checked very closely.

Sp Gr by the method under wax [using alcohol warmed to from 42° to 45° C]	0.889
Sp Gr by the 'sinker method'	0.888

Acting upon the suggestion of Dr. Joseph L. Mayer, I prepared mixtures of alcohol and water with their specific gravities accurately determined at 25° C by means of a Geissler pycnometer. The range of specific gravities of these mixtures varies from the specific gravity of paraffin to that of wax.

With the samples of alcohol and water ready it is only necessary to place them in small test-tubes, adjust to a temperature of 25° C, add a globule to the contents of the tube and when the one is found in which the globule floats indifferently, read the specific gravity of the liquid from the label on the bottle and this represents the specific gravity of the substance examined.

#### SUMMARY

1. The U. S. P. should describe a method for determining the specific gravity of paraffin.

2. The method for determining the specific gravity of wax modified, however, to have the alcohol warmed to from 42° to 45° C is an excellent one for paraffin.

3. The results by the U. S. P. method for wax and the "sinker method" agree very well when applied to paraffin.

DEPARTMENT OF CHEMISTRY

BROOKLYN COLLEGE OF PHARMACY, LONG ISLAND UNIVERSITY



Seventh Congress of Military Medicine and Pharmacy Madrid, 1933

Reference has been made in a preceding issue of the JOURNAL to the Congress of Military Medicine and Pharmacy. The illustration above is from *The Pharmaceutical Journal and Pharmacist* of June 17th and data are also taken from the same publication. Dr. A. Madinaveitia y Taburo demonstrated the 'Utilization of the Spectrograph for the Determination of the Structure of Organic Substances.' Pharmacist-Major Dr. R. Fraguas

Fernandez demonstrated the preparation of granules, tablets, capsules, medicinal wines, liquors and syrups, automatic filling machines and liquids. Other contributions related to sterilization, making of ampuls, preparation of ointments by Dr. Miguel Campoy, Dr. Pedro Calvo y Muñoz Torrero and others. A motor pharmacy was demonstrated by Pharmacist-Major Dr. Miguel Campoy Irigoyen.

## A STUDY OF VEHICLES FOR MEDICINES \*

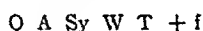
BY BERNARD IANTUS, H A DYNIEWICZ AND J M DYNIEWICZ

## 2 AROMATIC ELIXIRS

If the question were put to a vote 'Which is the most delicious of all vehicles?' would not the Aromatic Elixir receive first place? That it is popular is evidenced by the fact that, in Prof E N Gathercoal's Prescription Ingredient Survey, it scored a usage of 63.7 per 10,000 prescriptions. We, therefore, started this study with the proposition that the elixir itself is not susceptible to further improvement.

A good deal of dissatisfaction has been expressed about the difficulty and tediousness of clarification of the aromatic elixir, as prepared in accordance with the present formula of the Pharmacopœia. This dissatisfaction is strikingly demonstrated by the number of modifications of the formula that have of late been proposed, all of which deal with the sequence of mixing of the ingredients. To arrive at a rational conclusion regarding these, it seemed necessary to devise a brief method of notation, to make it possible for the eye and mind to contrast the various processes advocated.

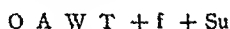
The order of mixing the ingredients of the "Aromatic Elixir of U. S. P. X" is as follows: to the compound spirit of orange (abbreviated O) add the alcohol (abbr. A), to this is added the syrup (abbr. Sy) in several portions and afterward the water (abbr. W), and the turbid mixture is clarified by filtering (abbr. f) through talcum (abbr. T). We propose to represent this sequence by the following formula:



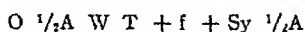
## LESSENING OF VISCOSITY TO LESSEN FILTRATION TIME

One group of suggestions that has been advanced, in order to shorten the filtration time, has been to lessen the viscosity of the fluid to be clarified by using sucrose (abbr. Su) instead of the syrup, and dissolving it or the syrup in the fluid *after* its clarification.

Thus, Professor Crockett suggests to mix all the ingredients, excepting the sugar, to filter until clear, and then to dissolve the sugar in the filtrate. His sequence might be expressed by the formula:

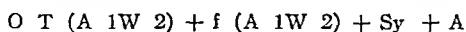


Silver (1) proposes the mixing of the compound spirit of orange with one-half the amount of alcohol and adding the water in several portions, then the talcum and filtering the cloudy fluid through a well-wetted filter, returning the filtrate until clear. Clarification can be accomplished in three-quarters of an hour. We shall call this Chapter I of Silver's process. Chapter II consists in mixing the syrup with the other half of the alcohol. This is then added in divided portions to the clear liquid, shaking after each addition. This process may be expressed by the formula:



\* From the Laboratory of Pharmacology at the College of Medicine of the University of Illinois and assisted by a grant of the AMERICAN PHARMACEUTICAL ASSOCIATION.

The most complicated modification of the preclarification methods before the addition of the syrup, is that proposed by Schifflet (2). Like Silver, he holds back some alcohol from the original oil mixture and he uses some of this reserved alcohol, in an attempt to wash the talcum free from the absorbed oil, and finally adds another portion of the reserved alcohol to the finished preparation, in order to clarify it of any turbidity that has been produced by the addition of the syrup. His sequence of mixture might be represented in the following manner



It will be noted that Schifflet's method also consists of two chapters. Chapter I, in which the oil mixture is treated with hydro-alcoholic solvent in the presence of talcum and Chapter II, in which the syrup and the balance of the alcohol are added to the clarified preparation without either of these ever having had the chance to become saturated with the oil mixture.

#### EVALUATION OF METHODS

The methods proposed, may be criticized under 3 headings

- 1 Unfilterable subdivision of the volatile oils
- 2 The use of talcum
- 3 Partial use of solvent

1 The real difficulty in clarifying the aromatic elixir prepared by all the methods in which the oil mixture is dissolved in the alcohol, to which then the aqueous moiety is added in several portions, is the production of an almost colloidal subdivision of the oil particles, a subdivision so fine as to make it incapable of clarification by simple filtration. This is, of course, done with the hope of securing maximum oil saturation of the finished liquid.

2 To remove this almost colloidal turbidity, three per cent of talcum is added which, as Krantz and Carr (3) have pointed out, coagulates the oil particles by neutralizing their negative electric charge by an oppositely charged ion and then absorbs the coagulated particles on the surface of the insoluble filtering medium. It is obvious that, if the subdivision of the oil were not so fine as to have it filter-passing, the use of the talcum and with it the time consumed in filtration could be dispensed with. Indeed, the use of the talcum also affects the hydrogen-ion concentration of the elixirs prepared with it, for we find that the hydrogen-ion concentration of elixirs in which it has been used varies between 6.08 and 6.01, while the hydrogen-ion concentration of the elixirs prepared without talc ranges about a  $p_H$  of 5.24.

That the use of the talcum is not only time-consuming, but that it is also wasteful of oil, is suggested by the investigation of Henry Burlage, who compares an elixir made by the official method with one made in the same way, but with the use of twice the quantity of talcum. He finds the percentage of oil content of the latter to be 0.0044+ as compared with the oil content of the official elixir at 0.19—, quite a difference.

3 Silver and Schifflet, by reserving a portion of the solvent (alcohol and syrup), to be added to the clarified oil-alcohol-water mixture (Chapters I and II of their processes) commit the error of not giving *all* the solvent a chance to become

saturated with oil. How grievous this error is, has been beautifully demonstrated by Burlage's investigation which showed that the elixir resulting from Schifflet's procedure contained only 0.003% and that from Silver's procedure, in which even more alcohol is kept from saturation with the oils, contained only 0.001% per cent of volatile oil.

#### THE PRINCIPLES OF ELIXIR MAKING

We may now be ready to formulate certain principles that might enable us to develop a more satisfactory formula.

1 *Viscosity must be kept low until after clarification.* With this principle most of the students of this question agree.

2 *Filtration through talcum or other absorbent powder must be abandoned,* because it wastes time and oil, and changes the hydrogen-ion concentration of the resulting elixir.

3 To abandon filtration through talcum, and yet be able to add an excess of oil mixture to secure complete oil saturation of the elixir, we must *avoid precipitation of the oils in globules so fine that they pass through filter paper*, which we can do by taking advantage of the law that the fineness of a precipitate is in proportion to the dilution of the reacting solutions. At the same time, the globules must be small enough to remain in suspension. For, to secure the same degree of oil solution from the coarser globules, we must allow a time factor to enter, and, unless some of the oil remains in suspension, frequent agitation would be required to give the solvent adequate opportunity at oil surfaces. No doubt, occasional agitation might be of value in any case, as some of the oil accumulates on the surface. We find that, if we add the compound spirit of orange to the mixed solvents—using an aliquot portion of water instead of the syrup—we secure exactly such subdivision of the oil.

That temperature affects the size of oil globules is shown by the following observations: when we add the compound spirit of orange to the mixed solvents heated to a temperature of 71° C. the resulting liquid is almost clear, but it becomes milky on cooling to room temperature, the degree of its cloudiness being somewhat greater than that of the mixture made at room temperatures. When we agitated the compound spirit of orange with the mixed solvents, previously cooled to a temperature of 10° C., we find that the resulting mixture is still less turbid and that there is a greater quantity of unemulsified oil floating on the surface. The clear filterability of the mixture secured at room temperature, when a hard filter is used, makes the artificial temperature changes merely of interest in showing that variable results might be obtained by variations in temperature.

4 Both Silver and Schifflet have demonstrated that it is a poor policy to retain any of the solvent until after clarification, because, of course, we cannot get a saturated solution unless we give all of the solvent a chance to become saturated.

#### A RAPID METHOD OF ELIXIR PREPARATION

It seems, then, that the problem of a more expeditious preparation of the official elixir would be solved were the very *fine* subdivision of the oils prevented as can be done by adding the compound spirit of orange to *all* the solvent ingredients, previously mixed, permitting this mixture to stand for twenty-four hours

(if time permits), and filtering through a *hard* filter (Whatman 50) to absorb the excess of oil. This process is strictly analogous to the modern method of preparation of aromatic waters, which was introduced into the tenth revision of the Pharmacopœia to take the place of the talcum process, that was objected to, not only because of its adding foreign ions to the solution, but also because the finished water seemed less aromatic.

After all, one cannot force more solute into a liquid than that liquid *can* dissolve, and saturation will occur if one gives the solvent time enough to act upon the solute, even if the latter be not present in the finest possible degree of subdivision. Therefore, it seems to us an error to produce so fine a subdivision of the oil that one has great difficulty in filtering out the excess, and must add an absorbent to the liquid, which wastes not only time but also oil in filtration.

While we hesitate to make the existing confusion still more confounded by proposing another sequence to the many that have been advanced, we do so with the belief that we might thereby clarify the situation and the elixir as well.

### ELIXIR AROMATICUM

#### Aromatic Elixir

Elix. Arom.	Simple Elixir
Compound Spirit of Orange	12 cc
Sucrose	320 Gm
Alcohol	250 cc
Distilled Water	550 cc
To make	1000 cc

Mix the alcohol with the water, add the compound spirit of orange and agitate vigorously repeating the agitation from time to time in the course of twenty four hours. Filter through a hard filter (such as Whatman 50) returning, if necessary, the first portions of the filtrate until it passes through clear. Dissolve the sucrose in the clear filtrate, either by agitation or by percolation adding enough of water and alcohol in the proportion of 2 of water to 1 of alcohol to make the final product measure 1000 cc.

This gives us as the mixing formula

$$A W O + f + Su,$$

which may seem almost too simple. Our forefathers said "*Simplex sigillum veri*" (The simple is the sign of the truth.)

(*Iso Alcoholic Elixirs* follow in next issue of the JOURNAL)

### STERILITY OF ALCOHOL

H Eschenbrenner *Apoth-Ztg* 47 (1932) 1578. The examination of 34 samples of alcohol of strengths ranging from 70 per cent upward showed that 20 of these were not sterile. In alcohol taken from storage tanks and especially in the sediment from the tanks a great variety of spore forming bacteria were found chiefly from the groups of hay bacilli *B. sub*

*tilis* and at least five kinds of gram positive rods. Tetanus spores could not be detected. Although definitely pathogenic bacteria have never been found in alcohol it is not certain that these other forms are entirely innocuous. It is thus necessary to sterilize alcohol which is to be used for surgical purposes or for the sterilization of instruments either by distillation or by passing it through a sterilizing filter.

# THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

G B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS  
DEPARTMENT

## AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

### THIRTY FOURTH ANNUAL MEETING

Officers *President* Charles H Stocking, *Vice President*, Robert C Wilson, *Chairman of Executive Committee*, Charles B Jordan *Secretary Treasurer* Zada M Cooper

Monday, August 28th

9 00 A M Meeting of Executive Committee  
9 30 A M Meetings of Teachers' Conferences  
Pharmacy, Louis W Rising *Chairman*  
Chemistry, Perry A Foote, *Chairman*  
Pharmacognosy and Pharmacology, B V Christensen, *Chairman*  
Pharmaceutical Economics, W Bruce Philip, *Chairman*

### CONFERENCE OF TEACHERS OF PHARMACY

Officers *Chairman* Louis W Rising *Vice Chairman*, Henry M Burlage, *Secretary*  
Frederick V Lofgren

#### PROGRAM

'The Necessity for Increasing Emphasis on the N F in Pharmacy Courses," William J Husa  
When Dispensing Should Begin in the Four-Year Course and How Much Time Should Be Devoted to It " D B R Johnson  
'The Part That Purdue School of Pharmacy Plays in the Student Health Service of the University," H W Heine  
'The Teaching of Incompatibilities ' W G Crockett  
"How Should a Course in Incompatibilities Be Taught and How Much Time Should Be Devoted to It" D B R Johnson  
'Teaching Incompatibilities," John S Mitchell  
'The Teaching of Incompatibilities " H A Langenhau  
What Type and Amount of Work Should Be Given a Student on Manufacturing Special Preparations for the Dental Profession?" A O Mickelsen  
'Shall Pharmacy Colleges Teach Dental Pharmacy?" George C Schicks

### CONFERENCE OF TEACHERS OF CHEMISTRY

Officers *Chairman*, Perry A Foote, *Secretary* Hugh C Muldoon

#### PROGRAM

'What the Department of Pharmacy Expects of the Department of Chemistry," H C Newton discussed by H V Army  
'The Inter Relation of the Departments of Pharmacognosy-Pharmacology and Chemistry,' B V Christensen discussed by W O Richtmann  
'Why Organic Chemistry Should Be Taught in the School of Pharmacy " C J Klemme, discussed by Ernest Little

### CONFERENCE OF TEACHERS OF PHARMACOGNOSY AND PHARMACOLOGY

Officers *Chairman* B V Christensen *Secretary* Charles E F Mollett

## PROGRAM

*(To be supplied)*

## CONFERENCE OF TEACHERS OF PHARMACEUTICAL ECONOMICS

Officers    *Chairman* W Bruce Philip    *Secretary*, Florin J Amrhein

## PROGRAM

*(To be supplied)*

Monday, August 28th, 2 00 P M

First Session of the Association

Roll Call

Memorial to W A Puckner L E Warren

Appointment of Committee on Resolutions

Address of the President Charles H Stocking

Report of the Secretary Treasurer Zada M Cooper

Report of the Executive Committee Charles B Jordan

Appointment of Nominating and Auditing Committees

Paper— Introductory Lecture to a Course in History of Pharmacy, ' Edward Kremers

Reports of Standing Committees

Committee on Higher Educational Standards William J Husa

Committee on Curriculum and Teaching Methods Wortley F Rudd

Committee on Activities of Students and Alumni Adley B Nichols

Delegates to American Council on Education Rufus A Lyman

Committee on Relation of Boards and Colleges Arthur F Schlichting

Syllabus Committee J G Beard

Monday, August 28th, 6 00 P M

Annual Dinner

Address Dr Glen Frank President of the University of Wisconsin

Monday, August 28th, 8 00 P M

Second Session of the Association

Report on 'Proposed Standards for the Classification of Schools of Pharmacy, A G DuMez

Report of Committee on Membership Standards Ernest Little

Tuesday, August 29th, 2 00 P M

Third Session of the Association

Reports of Special Committees

Committee on Student Branches of the AMERICAN PHARMACEUTICAL ASSOCIATION  
B V ChristensenCommittee on Establishment of a Pharmaceutical Corps in the United States Army  
Townes R Leigh

Committee on the Study of Pharmacy Charles B Jordan

Committee to Confer with Executive Council of the Association of American Medical Colleges Charles B Jordan

Paper— Use of the Library in Undergraduate Instruction ' Charles O Lee

Reports of Special Representatives

Representatives on American Council on Pharmaceutical Education A G DuMez

Representative to Drug Trade Bureau of Public Information William G Crockett

Reporter on Biological Abstracts Heber W Youngken

Representatives to National Conference on Pharmaceutical Research Glenn L Jenkins

Representatives to the Druggists' Research Bureau, Paul C. Olsen  
 Representatives to the National Drug Trade Conference, A. G. DuMoir  
 Representative to the National Association of Retail Druggists, Theodore J. Bradley  
 Historian, Edward Kremers  
 Representative on Committee on Centennial Celebration, William B. Day  
 Representative on National Drug Store Survey Committee, Charles E. Caspari  
 Representative to the Annual Congress on Medical Education and Licensure  
 Charles B. Jordan

Unfinished Business

Miscellaneous Business

Election of Officers

New Business

Executive Session

JOINT SESSION OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY AND THE AMERICAN  
 ASSOCIATION OF COLLEGES OF PHARMACY

Tuesday, August 29th

Report of the Fairchild Scholarship Committee, E. G. Eberle, *Chairman*

Paper—Is Compulsory Apprenticeship Registration Working a Hardship on Young Men  
 Entering Pharmacy? Charles B. Jordan

Resolutions from District Meetings A. F. Schlichting A. C. Taylor

*Corrections and additions will be made in Official Program*

PRESENTATION OF PRESIDENTIAL  
 CHAIR TO PHARMACEUTICAL SOCIETY  
 OF GREAT BRITAIN

Secretary H. N. Linstead of the Pharmaceutical Society of Great Britain in conjunction with the Executive of the Australian and New Zealand Pharmaceutical Association, completed arrangements during the month for a special broadcasting ceremony to be associated with the presentation of the Presidential chair to the Society by the combined pharmaceutical organizations of Australia and New Zealand.

To fittingly mark the occasion the chair is to be presented at the 70th annual meeting of the British Pharmaceutical Conference to be held in London during the last week in July. A representative of the British government will be present and it is expected that about 700 pharmacists will attend the banquet.

The arrangements comprise the utilization of the London Sydney telephone service to broadcast the ceremony. The officials of the Australian Association will be in attendance at Sidney headquarters at 3 A. M. on the night of the presentation, when the interchange of speeches will take place. Mr. David Dunn, president of the Australian and New Zealand Association, will formally present the chair and the other executive officers will take part in the proceedings. Amplifiers will be installed in the Conference Hall in London, so that all of those present will be able to listen to the addresses.

THE JAPAN PHARMACEUTICAL  
 SOCIETY

Participated in by some 2000 delegates assembled from all parts of Japan the 53rd general meeting of the Japan Pharmaceutical Society was held at the Gakushikai Hall, Kanda, Tokyo. The meeting was presided over by President Ueno. The officers are:

*President*, Dr. Kotaro Nishizaki, former head of the Imperial Hygienic Laboratory in Tokyo, *Vice President*, Dr. Sentaro Tani, *Directors*, Dr. Pharmacist-Lieutenant General Mataji Watanabe, Professor Katsuzemmon Keimatsu of the Tokyo Imperial University, Professor Heizaburo Kondo and Professor Yasuhiko Asahina of the same university.

Reports on the results of various researches and special lectures were delivered. The following are the more important of the reports made at the meeting: Seikichi Nakamura on 'Shinabana,' Shukan Suzuki and Ichiro Keimatsu on 'A Comparative Study of Various Aspirins,' Dr. Akira Ogata of the Tokyo Imperial University on 'A Study of Male Hormone and on a Study of Testicular Hormone,' Ryutaro Ueda (Tokyo) on 'The Experimental Cultivation of Artemisia Cinnamomea,' Shinjiro Aoyama of the Imperial Hygienic Laboratory on 'The Manufacture of Phenacetin,' Prof. Katsuzemmon Keimatsu on 'A Synthetic Study of Selen Organic Compounds.'



# ASSOCIATION BUSINESS

## AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1932-1933

Office of the Secretary, 10 West Chase St., Baltimore, Md

### LETTER NO 9

June 20, 1933

*To the Members of the Council*

65 Tentative General Program for the Eighty-First Annual Meeting With the approval of President Philip, Local Secretary Stanley, and the Committee on Standard Program of the Council the Secretary submits the following tentative general program Officials of the various affiliated organizations represented in the program have approved those features in which their respective organizations are directly interested

GENERAL PROGRAM FOR THE EIGHTY-FIRST ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION AND RELATED ORGANIZATIONS HOTEL LORRAINE, MADISON, WISCONSIN AUGUST 22-SEPTEMBER 2 1933

All dates included in special fare arrangements with railroads

### AUGUST 21-25

Plant Science Seminar Program and Meeting Rooms to be arranged

### SATURDAY, AUGUST 26

Afternoon and Evening

National Conference on Pharmaceutical Research—Colonial Room

American Council on Pharmaceutical Education—Time and Place to be arranged

### MONDAY AUGUST 28

9 00 A M Council A Ph A —Green Room  
9 00 A M N A B P —Pompeian Room  
9 00 A M A A C P —Executive Committee—Room 201  
Chemistry Conference—Crystal Room A  
Pharmacy Conference—Crystal Room B  
Materia Medica Conference—Colonial Room  
Pharmaceutical Economics Conference—Senatorial Room

1 30 P M N A B P —Pompeian Room  
1 30 P M A A C P —Crystal Room  
6 00 P M Dinner N A B P —Pompeian Room  
6 00 P M Dinner, A A C P —Crystal Room  
9 30 P M Reception—(Informal) followed by dancing—Crystal Room

### TUESDAY AUGUST 29

9 00 A M Joint Meeting N A B P and A A C P —Crystal Room  
1 30 P M First Session, House of Delegates—Crystal Room  
2 30 P M N A B P —Pompeian Room  
2 30 P M A A C P —Crystal Room  
6 30 P M Banquet, A Ph A and Related Organizations—Crystal Room

### WEDNESDAY, AUGUST 30

9 00 A M First General Session, A Ph A —Crystal Room  
12 15 P M Luncheon, Syllabus Committee—Senatorial Room  
2 00 P M First Session, Scientific Section—Crystal Room A  
2 00 P M First Session Section on Education and Legislation—Crystal Room B  
2 00 P M First Session, Section on Commercial Interests—Pompeian Room  
2 00 P M First Session, Conference of Pharmaceutical Association Secretaries—Colonial Room  
3 00 P M Joint Meeting, Executive Committee, N A R D and Council A Ph A —Green Room  
6 00 P M Dinner, Kappa Psi Fraternity  
6 00 P M Dinner, Phi Delta Chi Fraternity  
6 00 P M Dinner Rho Chi Fraternity, followed by annual convention  
6 00 P M Dinner Lambda Kappa Sigma Sorority  
6 00 P M Dinner, Kappa Epsilon Fraternity  
8 00 P M Second Session, House of Delegates—Crystal Room

## THURSDAY, AUGUST 31

- 9 00 A M Council A PH A—Green Room  
 9 00 A M Second Session, Section on Commercial Interests—Pompeian Room  
 9 00 A M Second Session, Scientific Section—Crystal Room A  
 9 00 A M First Session, Section on Practical Pharmacy—Crystal Room B  
 9 00 A M First Session, Section on Historical Pharmacy—Senatorial Room  
 9 00 A M First Session, Conference of Law Enforcement Officials—Colonial Room  
 12 00 M Veteran Druggists Luncheon—Main Dining Room  
 2 00 P M Second General Session A PH A—Crystal Room  
 5 30 P M Lawn Party and Dinner at the Home of Dr Edward Kremers (Busses will leave the Hotel Loraine at 5 00 to 5 15 P M and will return before 8 P M for the evening sessions)  
 8 00 P M Joint Session, Scientific Section and Section on Practical Pharmacy and Dispensing—Crystal Room  
 8 00 P M Joint Session, Section on Education and Legislation, Conference of Pharmaceutical Law Enforcement Officials and Con-

ference of Pharmaceutical Association Secretaries—Pompeian Room

## FRIDAY, SEPTEMBER 1

- 9 00 A M Third Session House of Delegates—Crystal Room  
 2 00 P M Third Session, Scientific Section—Crystal Room A  
 2 00 P M Second Session, Section on Practical Pharmacy—Crystal Room B  
 2 00 P M Second Session, Section on Historical Pharmacy—Senatorial Room  
 2 00 P M Second Session, Conference of Law Enforcement Officials—Colonial Room  
 2 00 P M Second Session, Conference of Pharmaceutical Association Secretaries—Pompeian Room  
 5 45 P M Dinner, Former Presidents A PH A—Colonial Room  
 6 00 P M Special dinners  
 7 30 P M Final Session, House of Delegates—Crystal Room  
 8 30 P M Final General Session A PH A—Crystal Room  
 9 30 P M Farewell Party—Crystal Room  
 10 00 P M Council A PH A—Green Room

## SATURDAY, SEPTEMBER 2

All Day Entertainment to be arranged

## TRANSPORTATION TO MADISON

On account of the Century of Progress Exposition, greatly reduced rates to Chicago will be in effect from most places—as low as one fare plus 25 cents for the round trip and slightly higher rates for longer time limits

The Committee on Transportation has secured a reduced round trip rate of one and one-third fare to Madison on the identification certificate plan good for thirty days and the certificates will be sent to members later. Tickets on this plan will be on sale as early as August 14th in distant territories

It is suggested (1) That members should buy the best special excursion ticket to Chicago they can get and use the identification certificate to buy round trip ticket from Chicago to Madison, (2) members whose route to Chicago is through Madison should buy the best special excursion ticket to Chicago and obtain stop over at Madison for the meeting

*(Motion No 20) It is moved by Kelly that the tentative General Program of the Eighty-First Annual Meeting be approved*

66 *Authorizing Dr Hilton to Sign Checks in the Absence of Treasurer Holton* Treasurer Holton expects to be away during the months of July and August and requests that Dr S L Hilton be given authority to sign ASSOCIATION checks during his absence. Dr Hilton has kindly consented to act and the necessary forms have been furnished by the Merchants and Newark Trust Company and by the Baltimore Trust Company

*(Motion No 21) It is moved by Eberle that S L Hilton be given authority to sign Association checks during the absence of Treasurer Holton and that the president and secretary be authorized to execute the necessary papers to be filed with the approved banks of deposit*

67 *Research Award* Chairman Army of the Committee on Research writes

Ten voting sheets have come back in response to Research Committee Bulletin No 3 All favor granting \$1000 from the Research Fund to Dr W J Husa and his associates at the University of Florida for a continuance of his fine work on Extraction

Dr Husa writes me that it will be a great service to him if he can be officially informed of the grant as quickly as possible As I understand his letter the check itself may follow our usual procedure of a September dating On the other hand, official notification of the ASSOCIATION'S action will greatly facilitate his arrangements with his University as to research staff appointments as said appointments should be made on July first'

*(Motion No 22) It is moved by Arny that a grant of \$1000 from the Research Fund be made to Dr W J Husa for the continuation during 1933-1934 of his research on extraction payment to be made after the Madison meeting*

68 *Contract for Printing Binding and Distributing the Year Book Volumes 20 and 21 for 1931 and 1932* Volume 19 of the YEAR BOOK, for 1930 has recently been completed and distributed Editor DuMez recently advised that copy for Volume 20 for 1931 is completed and that copy for Volume 21 for 1932 will be completed in about four months, and recommended that they be issued in one binding because of the saving, as was done with Volumes 16 and 17 Under this arrangement it is possible that the combined volume will be distributed toward the end of this year bringing the publication up-to date

Bids were promptly obtained for the combined volumes from the firms that have recently submitted bids on the publication The Lord Baltimore Press which firm has printed and distributed the last four volumes submitted the lowest bid The prices are the same as for Volume 19, with the exception of proportionate increases for the added binding and shipping on account of the combined volume as the firm was able to protect against recent advances in the cost of materials

The Treasurer's Reports and the Reports of the Progress of Pharmacy for 1931 and 1932 will be printed separately in the double volume and the index will be combined following the arrangement for Volumes 16 and 17

The larger reading page used in printing the Report of the Progress of Pharmacy in Volume 19 will probably be used throughout Volumes 20 and 21 as it effected considerable saving in cost and will reduce the size of the double volume

*(Motion No 23) It is moved by DuMez that Volumes 20 and 21 of the Year Book be issued in one binding, and that the contract for printing, binding and distributing the combined book be awarded to the Lord Baltimore Press Baltimore Md on the basis of their bid of June 17 1933*

69 *Applicants for Membership* The following applications properly endorsed and accompanied by the first year's dues have been received

No 161, George Edwin Byers 1808 Spring Garden St Philadelphia, Pa No 162 Charles C Charmley, 902 E Johnson St, Madison, Wis No 163, James M Dille, 4311 Grant St, Omaha Nebr, No 164 Miles Edward Drake 6123-83rd St, S E, Portland Oreg No 165, Joseph Hamilton Edwards Cayon & New Sts, Basseterre, St Kitts, B W I No 166 Frank Eten 299 Stuyvesant Ave Lyndhurst, N J, No 167, Inez Gilbert 521 S 11th St Corvallis, Oreg, No 168 Joseph Matkowitz 179 Dumont Ave Brooklyn N Y No 169 Tom Matthews 2429 East 17th Ave Spokane Wash No 170 Israel Jacob Rechtweg 304 Echo Place Bronx N Y, No 171 T H Rider, c/o Wm S Merrell Co, Cincinnati Ohio No 172 Abe A Rovell 5802 Tower Ave, Superior Wis No 173 Ernest Royce, Napa State Hospital, Imola, Calif

*(Motion No 24) Vote on applications for membership in the American Pharmaceutical Association*

E F KELLY Secretary

#### THE NEW DANISH PHARMACOPŒIA

The eighth edition of the Danish Pharmacopœia was issued in March A decided change is the adoption of the International Chemical Nomenclature which is in accord with

that of the United States Pharmacopœia Nearly all the tests and assays are defined in connection with the drugs and preparations Biological assay is prescribed for digitalis and for cod liver oil

# COMMITTEE REPORTS

## THE PHARMACEUTICAL ASPECTS OF SOCIALIZED MEDICINE

BY H. V. ARNY, PH.D.\*

On January 9, 1933, at the mid winter session of the general committees of the N. Y. S. Ph. A. President Müller appointed as a special committee on socialized medicine Messrs. Goldschmidt, Gesoalde, Seley and Arny. During the winter this committee held two conferences and transacted other business by correspondence. A final conference was held at Stamford, N. Y., on June 20th, and the following report represents the unanimous opinion of the committee after six months' study of the important and complicated problem.

The main task of the committee was a study of the now famous "Final Report of the Committee on the Costs of Medical Care." Explanatory and critical literature from medical and pharmaceutical journals and from the press has been scanned. Of importance, second only to the 'Final Report' is the book 'Medicinal Education'—a report emanating from the Commission on Medical Education. From the mass of detail this afforded us, your committee has elicited the following facts:

### REPORT OF COMMITTEE ON COST OF MEDICAL CARE

This committee consisted of 50 members: medical workers, social workers, educators and business men. There were 15 practicing physicians, 2 dental surgeons and one practicing pharmacist (Mr. Ambrose Hunsberger of Philadelphia). The statistical work was conducted by a research staff of 13 experts, one of whom (Dr. Robert P. Fischels of Trenton) is a pharmacist. The survey covered a period of five years and resulted in the publication of a number of statistical Bulletins and a 'Final Report' which contains the 'Majority Recommendations' (five in number). It also contains two minority reports, as well as a number of printed expressions of individual opinions. These recommendations and minority reports have been given publicity in the pharmaceutical press, hence at this time we will merely outline the committee recommendations (signed by all but 13 members of the committee) and the recommendations of the principal minority group. It is significant that this minority report is signed by 8 practicing physicians and one layman.

*The Majority Recommendations* may be condensed to the following excerpt, but it is only fair to us to urge that those interested read the full text of the recommendations as found on page XVI of the 'Final Report' of the Committee:

1. Medical service should be furnished largely by organized groups: physicians, dentists, nurses, pharmacists, etc.
2. Recommendation that all basic public health services be extended so as to become available to the entire population.
3. Recommendation that the costs of medical care be placed upon a group payment basis through insurance, through taxation or through both of these methods.
4. Recommendation that there be formed agencies (state and local) for the study, evaluation and coordination of medical service.
5. Recommendations as to improvements in professional education of physicians, of dentists, of pharmacists, of nurses and nursing aids and of midwives. As to pharmacists, the education should place more stress on the pharmacist's responsibilities and opportunities for public service."

*The Principal Minority Report* stresses the following:

1. Governmental competition in the practice of medicine should be discontinued and its activities should be restricted to the medical departments of the Army, Navy and other governmental agencies and to the various types of government hospitals.

---

\* A report of the committee on socialized medicine of the New York State Pharmaceutical Association presented to the Association at its 1933 meeting.

- 2 The Government should relieve the private practice of medicine from the care of indigents
- 3 Approval of Item No 4 of the Majority Report
- 4 Restoration of the general practitioner to the central position in medical practice
- 5 Recommendation that the corporate practice of medicine financed through intermediary agencies be vigorously opposed
- 6 Recommends the trial of methods which can be rightly fitted into present day practice without interfering with the fundamentals of medical practice
- 7 Recommends the development by state and county medical associations of plans for medical care

#### REPORT OF THE COMMISSION ON MEDICAL EDUCATION

The book "Medical Education" prepared by this Commission under the leadership of Dean Rappleye of Columbia University School of Medicine discusses the education of physicians rather than socialized medicine. These two subjects are however, so closely intertwined in present day medical thought that much valuable information concerning the present trends of the practice of medicine are given. Of particular value are the 120 statistical tables giving present (1932) information concerning all phases of the practice of medicine. As the book came out at about the same time as the "Final Report" of the Committee on the Costs of Medical Care, the information given in one book supplements the other, while opinions upon the same subject as present in the two books sometimes exhibit marked differences. The book "Medical Education" is essentially a presentation of statistical information. Recommendations are few and informative. Some of these are summarized below.

- 1 Deplores self medication, stating that this is 'largely through patent medicines and home remedies supplied by the 60 000 drug stores of the country'
- 2 Aides used by the medical practitioner are (a) hospitals, (b) clinics, (c) nurses, (d) dentists, (e) optometrists, (f) midwives, (g) laboratory services, (h) dietetics. It is significant that nowhere in the list is pharmacy mentioned. It is further significant that the words 'pharmacy,' 'drug' and 'medicines' are not to be found in the index of the book.
- 3 Too much rigidity is demanded by law in the medical school curriculum.
- 4 Criticizes pharmacology courses for clinging "to the older type of teaching including identification of drugs, compounding of prescriptions and other features of pharmacy."
- 5 Discussing therapeutics, the book states "there is less reliance placed now upon drug therapy than was the case in the past because the virtues claimed for many drugs have not as yet been demonstrated." Modern therapeutics emphasizes organ therapy, vaccines, sera, radium, heliotherapy, etc.
- 6 Pharmacology teachers should emphasize the part played by patent medicines and nostrums in directing the public to medication without diagnosis.

#### THE RELATION OF PHARMACY TO THESE REPORTS

As citizens we are all deeply interested in problems relating to medical care. As members of the pharmaceutical calling we have a sympathetic interest in the well being of that fine group of professional men the medical practitioners. As members of the N Y S Ph A, our retail pharmacists must ask the question, 'Where do we fit in the plans outlined in the two reports outlined above?'

In the Rappleye Report Pharmacy is treated with contemptuous neglect. This report is a typical example of the therapeutic nihilism that has pervaded the minds of the medical teachers during the past quarter-century—a situation that may be condensed to the aphorism 'diagnosis everything treatment nothing.' Medical students of to day are trained to accurately diagnose a disease and are then left to flounder as far as treatment is concerned. This floundering finally lands the young physician into the arms of the 'ethical private formula' manufacturer and thus is started the prescribing of proprietaries and the self medication on the part of the public which medical publicists so deeply deplore.

There is, in truth, no message of hope for Pharmacy in the Rappleye Report

In the *Bulletins of the Committee on Cost of Medical Care*, there is much material for study by us pharmacists. The book, 'The Costs of Medicines,' by Drs. C. Rufus Rorem and Robert P. Fischelis (*Bulletin No. 14*) should be read by every retail druggist, since it gives us information statistical and otherwise, concerning the present condition and trends of retail pharmacy that few of us have realized. It seems to your committee quite unfortunate that so little of the material in Dr. Fischelis' book was utilized by the medical care committee in its Majority Report.

This Majority Report considers Pharmacy from two angles. One is in the shape of the year long propaganda of the American Medical Association against proprietary medicines. In our reading of this portion of the Majority Report your committee fails to note mention of one of the primal causes of the nostrum evil of to day: the evolution of which may be traced through the following steps: (a) therapeutic nihilism in medical schools, (b) ignorance of young physicians as to rational prescribing, (c) recourse to the manufacturers of "ethical proprietaries," (d) the "ethical proprietary" of to day becomes the advertised "nostrum" of to morrow, at times, with the printed boast "prescribed by 50,000 physicians."

As to the pharmacy in which we are interested, the prescription business of our retail pharmacies the Majority Report gives us cold comfort. The frank recommendation of the majority of the medical care committee is that medical practice of the future be concentrated in medical centers or in private group clinics. We pharmacists know what step motherly treatment the average hospital pharmacist receives from his medical superiors. We know that in most hospital groups "low pharmaceutical salaries and cheap drug supplies" are the slogans. One of us has personal knowledge of one of the best hospitals in a large western city where the gifted pharmacist and his staff are tucked away in the dark basement next to the hospital kitchen. This situation is evidently designed to emphasize the statement of Sir Thomas Bulleyn (16th Century) that the apothecary is the physician's cook. If the proposed medical plans of the "Majority Report" go through, if all of the 120,000,000 people in the United States have to go to hospitals and private clinics for medical treatment, if the independent medical practitioner is to go to the wall, then the independent pharmacist is doomed to extinction.

Of course the extremists of the medical care committee are not to have their way. We have already mentioned that the principal minority report of the medical care committee is signed by eight out of the fifteen practicing physicians on the committee and discussions during 1933 at state and local medical society meetings indicate a vigorous opposition on the part of the rank and file of medical men in general practice against such socialistic propositions.

This fight should be waged upon the basic proposition: shall the individual practitioner be destroyed for the aggrandizement of the few who shout the battle cry "For the Public Good?" It is obvious to us that this battle will be fought by the individual medical practitioner and that we pharmacists need not worry as to the outcome—at least for fifty years to come.

Where, then, does Pharmacy come in? In our opinion, in the comparatively near future pressure will be brought to bear by the groups interested in this "Cost of Medical Care" movement to limit the practice of pharmacy more and more to the compounding of prescriptions and to the sale of drugs, medicines and poisons. All of us have given voice to this program as the aim of ideal Pharmacy. The cold facts as presented in the Fischelis Bulletin and extracted from other sources of information indicate that all of the prescriptions written by the physicians of the United States (165,000,000 prescriptions) distributed among all of the drug stores of this country (60,000) means 2780 prescriptions per annum, or 8 per day per drug store. This means 4 prescriptions per day per registered pharmacist. Other statistical data indicate that hasty, thoughtless and speedy legislation of restrictive character would tend to put 80 per cent of our drug stores out of business.

Your committee is ready to concede that pharmacy is overcrowded, but in these days all callings are overcrowded. Significant is one of the tables presented in the Rappleye Report. It will be recalled that the avowed object of the greatly increased requirements set for admission into medical schools in or around 1910 was to stop overcrowding in the medical profession. The Rappleye statistics show that between 1906 and 1920 the number of medical graduates in the United States dropped from 5364 to 3047 and that from 1920 to 1932 the graduate figure increased from 3047 to 4936. This is of course far more than the percentage increase in population. It is of great interest to note that during the past five years while the highly restricted medical courses

have produced an almost 60 per cent increase in medical graduates, the less restricted pharmacy courses have produced a decrease in graduates approximating 40 per cent

#### A PROGRAM FOR PHARMACY

What can Pharmacy and this Association do to meet this very serious issue?

Your committee offers the following suggestions

1 *Pursue a Laissez faire' Policy*—This would be suicidal. The pharmacist of the Province of Ontario overlooked the passage in 1932 of certain medical relief regulations 'by the legislative device known in Canada as "Order in Council"' and awoke to find that this legislation included a health insurance clause providing that physicians furnish for appropriate compensation not only medical services but also necessary medical supplies. A deputation from the Ontario Retail Druggists' Association called upon the Minister of Public Works and Labor, Dr Monteith, who was unmoved by the plea of the druggists that the necessary medical supplies" should be furnished by pharmacists. As the *Canadian Pharmaceutical Journal* puts it

The medical relief regulations were drawn up without the slightest regard for the retail druggists

They have been left out of the picture entirely

2 *Join Physicians and Dentists in Fighting the Proposed Plans*—Two warnings should be sounded in this connection. The three branches of medical service, the physician, the dentist and the pharmacist, must be careful in planning their line of attack. In the first place, among those of the medical costs committee who back the "Majority Report" are included a number of outstanding laymen distinguished for their altruistic interest in philanthropy and social service. Before legislative committees, members of this group command respectful attention because of the past records of disinterested social service. Their arguments that the proposed legislation is intended for the general good of the vast group of inarticulate poor, will be hard to meet. To oppose these arguments by tearful tales of doctors, dentists and druggists who will be reduced to penury, true though it may be, will scarcely serve the need of vigorous opposition. The following remarks on the subject made to medical men by Dr. Lewellus F. Barker of Johns Hopkins University are significant:

I want to warn my colleagues in the profession against too negative an attitude. This world is not static. This world is changing all the time. The medical profession must change with the rest of the world and keep pace with it. The negative attitude of our English and German *confreres* was very disastrous to the medical profession. That negative attitude did not prevent the development of health insurance in England and Germany. It put the doctors in a very false light. It excited public hostility against men whom the public were led to believe were acting from a selfish attitude rather than from a public spirited attitude, and worst of all the medical men lost their influence and leadership and had very little to say about the patterns of insurance that were established.

A second warning is addressed by your committee to pharmacists only and that concerns their relations with their medical *confreres* on the question of meeting the proposed legislation. Cooperate cordially with the medical and dental groups only when these groups give definite promises of backing the modifications proposed by Pharmacy. The Majority Report (page 135) recommends

The appropriate medical, dental, nursing and pharmaceutical societies should appoint committees to ascertain the facts regarding the provision of medical service, to study the various possibilities for extending the service and to prepare local and state plans accordingly.

Our association through its legislative committee or through our committee on socialized medicine should take immediate steps to secure a conference with similar committees of the State medical, dental and nursing societies in order to frame a suitable program of cooperation in preventing drastic legislation on the subject of socialized medicine.

3 *Formulate Plans for a Conservative Type of Health Insurance*—National Health Insurance has been in force in Great Britain since 1911 and while the plan met with violent opposition at the time of its inception we learn from English friends whose opinions are much valued, that the project has given fairly satisfactory results. The following information as to the British Act was furnished by Mr. Thomas Lewis in 1931 and was published in the *A. PH. A. JOURNAL* of that year.

I have mentioned the National Health Insurance Act and would like to give some idea of this. It was instituted in Britain in 1911 and under it all persons in employment not earning more than a certain wage must be insured against sickness. Each week both the employer and employee pay a certain fixed sum into the Insurance Fund by means of affixing a stamp to a card supplied to each employee by the Government Department concerned. The employer deducts each week a sum (I believe about 18 cents) from the wage paid, adds to it his own payment and purchases an insurance stamp from the post office for the total amount and fixes it to the card, canceling the stamp for further such use by dating it. The Government increases this amount by a further contribution of its own and this builds the National Health Insurance Fund. From this the employee obtains free medical treatment when sick and if unable to attend his work a certain weekly payment as well. Additional benefits added of late years are the supply of artificial teeth, spectacles and surgical appliances when prescribed by the physician. Suggestions have been made whereby the family of the insured person will also receive the same treatment at some future time by an adjustment of the Act.

The medical attention and the supply of medicines work in this way. The insured person is required to register with a physician who receives a payment of about two dollars per annum per insured person registered with him, whether he attends to the insured individual every day of the year or even if no medical attention is given at all. The physician, when necessary, writes a prescription which the sick person takes to any pharmacist on the Government Panel, and in this way receives what is prescribed, payment being made to the pharmacist by the Government through one or other of its Insurance Committees. It may be noted that no patent medicine or proprietary articles may be prescribed by the physician for insured persons. Payment is made to the pharmacist after the prescriptions have been priced by a pricing committee which proceeds to do the pricing for each drug separately according to an agreed National Price List, then adding to the total the dispensing fee which varies according to whether it is a mixture, ointment, gargle, etc., which has been prescribed. It is the duty of the Retail Pharmacists' Union to arrange these prices with the Government."

Mr. Hugh N. Linstead, secretary of the Pharmaceutical Society of Great Britain, has been good enough to furnish us the following additional information concerning the operations of Health Insurance in his country:

1. The British Medical Association informs me that 49.4 per cent of the medical practitioners of Great Britain are panel practitioners. They divide the medical practitioners into the following classes:

Consultants	7.5 per cent
Practicing as dentists	1.1 per cent
Insurance general practitioners	49.4 per cent
Non insurance general practitioners	22.9 per cent
Whole time officers of local government bodies, etc.	14.6 per cent
Unclassified	4.5 per cent
	<hr/>
	100.0 per cent

2. As there are roughly 17,500,000 insured persons and 17,500 insurance practitioners the average number of insured persons for whom an insurance practitioner is responsible is 1000. At present the insurance practitioner is suffering from



a 10 per cent National economy cut in his payment and receives 8/11/2d per annum for each insured person for whom he is responsible instead of the basic capitation fee of 9/- The average annual compensation is therefore £406 5 0

3 About 99 per cent of the chemists' shops are on the Insurance Panels The number in England and Wales is approximately 10 473 The number in Scotland is approximately 1300

4 The average income for each shop is about £200 per annum representing about 3/- for each insured person

Mr Linstead also answered four questions as to the premiums paid by those workers who are beneficiaries of Health Insurance He also kindly furnished us with a copy of the 32 page Bulletin of the Ministry of Health giving details of operation of the Health Insurance scheme These data will be shown inquirers on request In studying the above outline of British Health Insurance, it must be borne in mind that this insurance scheme applies to only 17,500 000 of the 44 000 000 inhabitants of Great Britain According to first hand information obtained by us the Health Insurance payments to the retail pharmacist go a long way toward covering the overhead of the chemist shop and the purchases of the 26 500,000 uninsured furnish a reasonable income to the approximately 12 000 pharmacists of Great Britain

#### CONCLUSION

The foregoing lengthy recital may be summarized as follows Above we have discussed

- 1 Data from the Report of the Committee on Cost of Medical Care
    - (a) Majority recommendations of the Committee
    - (b) Principal minority report
  - 2 Report of the Commission on Medical Education
  - 3 Relation of Pharmacy to these reports
  - 4 A program for Pharmacy
    - (a) Pursue a *laissez faire* policy?
    - (b) Join physicians and dentists in fighting the proposed plans?
    - (c) Formulate plans for a conservative type of Health Insurance?
- This section of the report gives data concerning the operation of Health Insurance in Great Britain since 1911

Organized pharmacy must be prepared not so much to fight the propositions outlined above as to see that adequate provisions of protection are given to our calling The one encouragement that one obtains from a study of the situation is that the fate of the average practicing physician and of the practicing dentist is as much at stake as is that of the practicing pharmacist The situation calls for organization in every county in the state of "professional guilds" such as Kings County has conducted with such distinct success during the past few years

A secondary item is the proposition made last winter that a law be passed (a) limiting the sale of all medicines (patent and otherwise) to registered pharmacies (b) prohibiting the sale of food tobacco etc in registered pharmacies Our direct information is

- 1 That this type of legislation will not be hurriedly pushed through the legislature
- 2 That one or two years of educational effort will be carried on prior to the introduction of the legislation
- 3 That such legislation is bound to come up eventually
- 4 That the project has been assured of ample financial backing
- 5 That the group behind the movement is more than willing to coöperate with existing pharmaceutical organizations

This matter is worthy of the careful attention of all of us having the interest of Pharmacy at heart

---

## THE PROFESSIONAL PHARMACY

### AN ANALYSIS OF PRESCRIPTION DEPARTMENT ACTIVITIES

BY FRANK A. DELGADO AND ARTHUR A. KIMBALL

(This analysis of Prescription Department Activities is part of the National Drug Store Survey and published under and by authority of the U. S. Department of Commerce, Bureau of Foreign and Domestic Commerce. The table of contents will acquaint the readers with the valuable information on professional pharmacy contained in the report, information that has never before been given and offers studies of the various phases of the important subject for the pharmacists and students in colleges of pharmacy.)

It is contemplated to print the report in four instalments. In due time notice will be given of the opportunity to secure reprints and it is suggested that readers make inquiry by addressing THIS JOURNAL as to how these reprints may be obtained, and the advantageous cost, if ordered in advance of completion of the report. Further information is given in the Foreword—*Editor*.)

#### CONTENTS

##### FOREWORD

##### INTRODUCTION

- Description of Survey Stores
- Description of Questionnaires Answered by 35 Professional Pharmacists
- Fixture and Prescription Inventory Requirements in Opening a New Store
- Association Membership
- Window Display and Observance of Pharmacy Week "
- Requirements of the Prescription Container

##### CHAPTER I Sales, Expense and Prescription Business in the Professional Pharmacy

- Sales Earnings and Operating Factors in Four Professional Pharmacies
- Operating Expense Breakdown in Professional Drug Stores
- Prescription Business Received by Telephone
- Time Study of Prescription Business in Three Professional Pharmacies
- Share of the Prescription Department in Sales Volume
- Number of Prescriptions Filled Daily and Annually by Type of Prescription
- Prescription Business by Type of Prescription in 1910, 1920 and 1930
- Prescription Business by Form of Prescription

##### CHAPTER II Seasonal Demand for Prescriptions

- Seasonal Demand for Regular Prescriptions
- Seasonal Demand for Narcotic and Liquor Prescriptions

##### CHAPTER III Prescription Price Trends

- Average Price of Prescriptions by Type of Prescription in Professional and Commercial Type Drug Stores—Changing Price Trends in 1910, 1920 and 1930
- Monthly Prescription Price Trends in Three Additional Professional Pharmacies
- Price Ranges of Prescriptions by Type and Nature of Prescriptions
- Prescription Price Ranges Compared between Professional and Commercial Type Drug Stores and for Prescriptions Filled in 1910 and 1920
- Inconsistency in Prescription Pricing—Prescriptions Priced below Cost
- Average Cost of Materials and Selling Price of Prescriptions Filled in Three Commercial Type Drug Stores, by Form and Type of Prescription

##### CHAPTER IV Prescription Business According to the Physicians Writing the Prescriptions

- Extent to Which Physicians Are "Detailed" by the Pharmacist
- Analysis of the Prescription Business of the Leading Physicians

Preference of Physicians for Official or Specialty Remedies

Prescription Business by Type of Practice of the Physicians Writing the Prescriptions

Legibility of Prescriptions

The Problem of Physicians' Errors in Prescription Writing

#### CHAPTER V Prescription Inventory Problems and Ingredient Analysis

Opening Business and Extent of Growth of the Drug Store's Prescription Department

Prescription Ingredient Requirements and Occurrence by Type of Ingredient in Professional and Commercial Type Drug Stores

Frequency of Occurrence of Prescription Ingredients

Number of Ingredients Required per Prescription

Private Formula Prescriptions

Number of Additional Ingredients Required in Filling Successive Blocks of 500 Prescriptions

Actual Inventory Summary of the Prescription Department of a Commercial Type Pharmacy

#### CHAPTER VI Simplification of the Prescription Department Inventory

Introduction of New Manufacturers' Specialties

Specialty Capsule Prescriptions

Method of Filing Information on Specialties

Specification of Galenicals of Particular Manufacture

Extent of Manufacturing in the Pharmacy

#### CHAPTER VII Study of the Leading Ingredients

Appearance of Narcotics among the Leading Ingredients

Lists of the Leading Ingredients

Analysis of the Leading Manufacturers' Specialties Classified into Groups According to Their Therapeutic Use and Action

Methods for Practical Use of the Lists of Leading Ingredients

Comparison with Other Lists of Leading Ingredients—Preliminary Facts from the U S P—N F Prescription Ingredient Study

### FOREWORD

With the ever increasing trend toward specialization in most fields of endeavor it is not surprising to find in the retail drug field a specialist—the professional pharmacy. These establishments in which the entire attention is centered on prescriptions and other commodities and services devoted to the public health are said to be growing in number particularly in locations in which offices of physicians are concentrated. A concentrated group of physicians naturally is the source of a large volume of prescriptions sufficient to keep several pharmacists busy. The many items of rare occurrence called for require a much more complete stock than is generally carried by the usual commercial type drug store. Often prescriptions which are very difficult to fill and which require unusual skill and fairly frequent practice are received. In the professional pharmacy such prescriptions can usually be delegated to a pharmacist who fills such prescriptions fairly frequently. A large prescription staff is also needed to supply the exacting service requirements of the physicians—prompt collecting of prescriptions and sufficient telephone equipment to receive prescriptions by telephone, prompt filling of prescriptions in spite of the large volume, prompt and special delivery service, keeping at hand information to answer physicians' questions in regard to new specialties and the like. Thus there are many reasons justifying the strictly professional pharmacy. It is as important a part of any medical building or other concentration of physicians as is the prescription compounding laboratory in a modern hospital.

Therefore in order to obtain a complete picture of the prescription filling activities of pharmacy this study of the professional pharmacy was included as an integral part of the National Drug Store Survey. The value of the information contained in this report is not believed to be confined to the proprietors of professional pharmacies. It contains much information which should be of practical value to the proprietors of commercial type drug stores in increasing their volume of prescription business and the profit possibilities of their prescription departments. Professors and students in colleges of pharmacy may find herein answers to some of the questions

about which there has been conjecture. Drug wholesalers and manufacturers of pharmaceutical supplies should find the list of leading ingredients which was compiled after an analysis of 20,000 prescriptions of particular interest. Pharmacists who are contemplating the operation of a professional pharmacy will find certain information particularly directed to them. It is hoped therefore, that all branches of the drug profession and trade will be in some way aided by the information presented in this report.

This report on the varied activities of the professional pharmacy is the second report from the National Drug Store Survey concerning the prescription department activities of the retail drug trade. The first report, published in 1932 was entitled "Prescription Department Sales Analysis in Selected Drug Stores," and concerned the professional activities of 13 commercial type drug stores in St. Louis, Mo.<sup>1</sup>

This present report on the activities of the professional pharmacy is to be printed in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION in several instalments, starting in the July 1933 issue. It will then be made available through the office of the secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION.

The proprietors of the various professional pharmacies analyzed herein kindly made available the records of their establishments, and the AMERICAN PHARMACEUTICAL ASSOCIATION (particularly E. F. Kelly, secretary of the ASSOCIATION, and E. G. Eberle, editor of the ASSOCIATION'S JOURNAL) made possible the publishing and distributing of the report. This study was made in the Merchandising Research Division of the Bureau of Foreign and Domestic Commerce, under the direction of H. C. Dunn, chief of that division, and Wroe Alderson, director of the National Drug Store Survey. Miss Ruby M. Sanders of the above division rendered valuable assistance in tabulating material contained herein.

## INTRODUCTION

The purpose of this report is to present a complete picture of the professional pharmacy—the pharmacy which centers its attention almost entirely on prescriptions and other items related to public health. A study of the professional pharmacy is a necessary part of any complete analysis of the retail distribution of drug store commodities and services such as has been undertaken in the National Drug Store Survey.

Of course, comparatively speaking, there are few professional pharmacies in the country. The actual number is a debatable question. However, Dr. C. B. Jordan, dean of the School of Pharmacy, Purdue University, who has made studies of professional pharmacies for a number of years and who is thus one of the best qualified to answer the question, places the number at slightly less than 400. One well known trade journal has recently, at great effort, compiled a list of the 3200 largest prescription drug stores in the United States. But it is not stated that these 3200 stores are necessarily professional pharmacies. In any event, the number is not a large part of the approximately 60,000 retail drug stores in the United States.

As for a definition of the term "professional pharmacy," there would undoubtedly be differences of opinion. Would only stores in which the entire volume consisted of prescriptions and other items related to public health be included, or would stores which enjoyed both a large prescription business and a large business of a commercial type be included? Or, again, would stores with a small prescription business but which had the definite purpose of building up only the professional phase be considered professional pharmacies? For the purpose of this report, only those pharmacies in which the majority of the business is in prescriptions and in which only the professional phase is promoted will be considered professional pharmacies. If half of a store's volume is in prescriptions, it is probable that the store is filling a sufficiently large number of prescriptions daily to be classed as a professional pharmacy. The fact that a professional pharmacy has a soda fountain or carries cigars and cigarettes, as a convenience to its patrons, should not rob the pharmacy of its professional character, as long as these lines are carried strictly as a matter of convenience. Particularly for professional pharmacies located in professional buildings, it is sometimes necessary to have a soda fountain and the like for the convenience of the physicians and others who frequent the building. However, none of the four St. Louis professional pharmacies which form the basis of this report had soda fountains.

<sup>1</sup> Available at office of Superintendent of Documents, Washington, D. C.

Four professional pharmacies located in St. Louis, Mo. were the test laboratories in which this detailed analysis was made. A large phase of this study was centered around a complete analysis, from every practical point of view, of 10,000 prescriptions filled by two of these four pharmacies. Also wherever such information would be of interest and value the findings in the professional stores are compared with those of the 13 commercial type drug stores analyzed in the first report on the professional phase of the National Drug Store Survey. Ten thousand prescriptions filled by the commercial type stores are analyzed and compared with the 10,000 prescriptions filled by the professional pharmacies. In addition to this material, a questionnaire containing 65 questions was sent to a large number of proprietors of professional pharmacies and was answered in full by 35 professional pharmacists. These questionnaire replies add a great deal to the supply of information concerning the professional pharmacy, and make it possible to present an even more complete picture than was at first contemplated.

To give an idea of how 'professional' the pharmacies included in the survey are, it might be stated that in the four St. Louis pharmacies, over 73 per cent of the total volume was in actual prescription business; these stores averaging from 112 to 219.4 prescriptions each per day, exclusive of liquor prescriptions. The 35 questionnaire stores had an average of 63 per cent of the total business represented by prescriptions and averaged 73 prescriptions each per day. These figures might be compared with those of the 13 commercial type stores analyzed in the first report on the prescription phase of the Survey which averaged only 15.3 prescriptions each daily, exclusive of liquor.

Various estimates of the total number of prescriptions filled in the United States annually have been made ranging from 120,000,000 to 300,000,000. A recent exhaustive private survey placed the number at close to 165,000,000, including refills. This would mean that the 60,000 retail drug stores in the United States fill an average of less than 8 prescriptions each per day. However, as there are many pharmacists who make no special effort to obtain prescription business and in fact many drug stores filling an average of as few as one prescription a day, there are many times eight prescriptions a day available to those pharmacists who strive for prescription business. Taking the average prescription business of the professional pharmacy as that reported by the 35 questionnaire stores, 73 prescriptions per day and using Dr. Jordan's estimate of the number of professional pharmacies in the country slightly less than 400, it can be estimated that between 10,000,000 and 11,000,000 prescriptions are filled annually in professional pharmacies. This would mean that professional pharmacies, less than 1 per cent of the total number of retail drug stores, fill between 6 and 7 per cent of the 165,000,000 prescriptions filled annually in the United States.

From the solely business viewpoint, the operation of the professional pharmacy would appear to be a profitable venture. The four St. Louis professional pharmacies studied had annual sales volumes averaging over \$107,000 each, on which they averaged over \$10,000 net profit each. Of course St. Louis is a large city and is outstanding in the way its physicians and patients support professional pharmacies, but the study in these four stores at least shows the possibilities of profit in prescription business when a store is able to maintain a large enough volume to operate as a professional pharmacy.

The number of professional pharmacies in the United States is slowly increasing and it is believed that in the future the trend will be toward an even larger number of these pharmacies with an increasing proportion of the total prescription business handled by professional pharmacies. One reason for this conclusion is the inauguration of the four-year course in colleges of pharmacy, effective as of this year. It hardly seems reasonable that students will continue to enroll in colleges of pharmacy in the same number as heretofore with no higher object in view than the opening of the usual commercial type drug store. Also in addition to the professional prestige to be gained there are a number of monetary reasons which will cause many pharmacists to prefer to operate a professional pharmacy. For one thing the competition is not as great for the present at least. There is less chance of encroachment by other types of establishments such as grocery stores and department stores. Also the hours in the professional pharmacy are inclined to be shorter than in the commercial type drug store. The majority of the 35 'questionnaire' professional stores opened at 8:00 A. M. and closed at 10:00 P. M. on week days and had average Sunday hours of from 9:00 A. M. to 8:00 P. M. but some of those stores had even shorter hours.

Naturally the number of professional pharmacies will always be limited. Small towns

and towns and cities where there is considerable dispensing on the part of physicians, will not present a good location for the embryo professional pharmacist. The proprietors of the 35 "questionnaire" stores estimated, on the average, that 20,000 people was the minimum population necessary to support a professional pharmacy. However, half of these 35 proprietors believed that 10,000 or less was a sufficient population for this purpose. Of course, a concentration of physicians' offices, particularly in a "medical" building will always offer a fine opportunity for the establishment of a professional pharmacy. In an eastern city, for example, there are three "medical" buildings located within a space of two blocks, and each of these three buildings supports a professional pharmacy. However, there are examples of very successful professional pharmacies located quite some distance from the district where physician's offices are centered. Such is the case, for example, in Baltimore, Washington, New York, Detroit and St. Louis. St. Louis possesses two professional pharmacies located far from the "medical" buildings yet both stores have a big prescription business and stand high in the esteem of physicians.

A professional pharmacy cannot be developed merely by having beautiful fixtures, a complete stock and delivery and other equipment. The professional pharmacist, probably to a greater extent than his more commercially minded brother druggist, will have to go out and bring in business. The methods employed by the professional pharmacist it is true, will be different. They will be dignified and professional, and in the main will consist in calling on physicians to win their friendship and inspire their confidence. Of course the prospective operator of a professional pharmacy must first select a suitable location and must obtain a well rounded stock, the basis of which may be the list of leading ingredients included in this report.

Among the factors responsible for the success of professional pharmacies are the following:

- 1 Knowledge and judgment, skill, experience, honesty, diligence, courtesy and personality of both the proprietor and his staff
- 2 Physicians' support, cooperation, confidence and friendship
- 3 Location, accessibility to physicians
- 4 Store arrangement, appearance and cleanliness, adequate equipment
- 5 Careful buying, quality, variety, purity and freshness of stock
- 6 Accuracy in filling prescriptions, reasonable prices commensurate with quality and service, factors of selling
- 7 Dependable service, every possible facility, such as sufficient telephone equipment, rapid calling for and delivery of prescriptions, prompt filling of prescriptions, prompt attention to mail orders, keeping new foreign and domestic preparations in stock.
- 8 Proper advertising and promotion, such as continual contact with physicians, meeting with and speaking before physicians and internists, furnishing prescription blanks.
- 9 Administrative ability—bookkeeping, adequate records, annual inventories and profit and loss statements, careful extension of credit, prompt collection of bills.

Nearly all of the factors enumerated above embrace the two outstanding phases of merchandising, cost control and sales promotion, in addition to the professional requirements. Thus, the proprietor of the professional pharmacy must be a good merchant, a capable business man, as well as a trained professional man. It is certainly true that in most cases the proprietors of professional pharmacies are leaders in the profession of pharmacy in their respective cities, and in some cases are national leaders in their profession. Professional pharmacists seem to be fairly young at the time they open their stores. Seventy one per cent of the 35 pharmacists answering the questionnaire were younger than 40 when they opened their stores, 38.7 per cent were under 30.

#### DESCRIPTION OF SURVEY STORES

The four professional pharmacies comprising the test laboratories around which the major portion of this report is centered are located in the uptown business district in St. Louis, Mo. This uptown district is a busy business center containing the theatrical center and many small shops. The four pharmacies are located within a space of two blocks, which fact does not seem to limit their sales volume. For all four stores had large volumes of business, averaging over \$107,000 each per year. Three of the four pharmacies are located in buildings which are almost entirely devoted to offices of physicians, dentists and members of allied professions. The surrounding nearby area has quite a few physicians' offices. Thus there is a justifiable reason for these professional stores to locate in this high rent business district.

None of the four establishments handled candy, cigars, cigarettes and other products of a nonprofessional type with the exception of a limited line of toilet goods and articles. The prescription business in these stores accounted for from 59 to 88 per cent of their total sales volume, the remaining volume being devoted to hospital supplies and other items related to public health.

Three of the four pharmacists were located on the ground floor, while the other was located on the second floor of a building devoted mainly to physicians' offices. As to the amount of space necessary for the operation of a professional pharmacy it might be stated that this would depend on the particular establishment. One of the St. Louis pharmacies has a floor space of about 985 square feet (41 by 24 feet) in the principal room. Of this space about 240 square feet are used for prescription work, 175 square feet for customers' space and 120 square feet for office space. In adjacent rooms the pharmacy has about 700 square feet, of which about 150 square feet are used for manufacturing, 200 square feet for prescription files and the balance for lockers and storage. There is also a space of about 120 square feet in the basement for storage.

Another of the test stores has a room measuring 17 by 30 feet (150 square feet) on the first floor devoted entirely to compounding stock and a waiting room for customers. This store has 18 feet of counter space for compounding and a corresponding amount of shelf space running 6 feet above the counter. In the basement this store has a space 30 by 50 feet (1500 square feet) in size of which 15 by 15 feet (225 square feet) is devoted to its laboratory and the balance used for storage.

Another test store has a space of 36 by 16 feet (576 square feet) in the main portion of the store. There is a 15 foot balcony in the rear underneath of which is the store's prescription department space about 15 by 20 feet (300 square feet) with appropriate shelving in every available space. In the center of this space is a 5 foot prescription counter and bookkeeper's desk (standing). There is also a 12 foot counter at the front of this space. The basement dimensions are the same as the floor above. There is a space at one end of approximately 225 square feet fitted with a laboratory table where all the heavy compounding and manufacturing is done. In addition, there is a hallway space of about 8 by 20 feet connecting the basement with an outside elevator, the larger portion of which is utilized for the storage of prescription ware, etc.

The other test store has a space of about 860 square feet (36 by 33 feet) with a 12 foot prescription counter in the rear. There is a width of 5 feet between the prescription counter and the wall cases in the rear. The office is on a balcony 15 feet long and extending out 8 feet from the wall. There is a 3 foot extension of the balcony around two sides of the store. The basement comprises 806 square feet, of which 120 square feet is used for manufacturing activities and the balance for prescription files and storage.

Thirty five professional pharmacists answering a questionnaire gave among other replies a statement concerning the size of their stores. The 35 pharmacies occupied an average of 1632 square feet, although the typical size was 1075 square feet. The largest sized store occupied 10,320 square feet, the smallest only 308 square feet.

#### DESCRIPTION OF QUESTIONNAIRES ANSWERED BY 35 PROFESSIONAL PHARMACISTS

Dr. C. B. Jordan, Dean of the School of Pharmacy of Purdue University, has conducted a study of professional pharmacies in each of the four years from 1929 through 1932. The material for these studies has been gathered by means of questionnaires sent to a fairly complete list of professional pharmacists throughout the country. For Dr. Jordan's 1932 study, one of the authors of this report was kindly permitted to prepare a questionnaire consisting of 66 questions with subdivisions making a total of 130 questions. Dr. Jordan sent this questionnaire to approximately 400 professional pharmacists, 40 of whom returned it. Only in the case of 35 of the 40 was the questionnaire answered nearly complete. These 35 questionnaire returns are used for the basis of the supplemental material for this report. The authors greatly appreciate Dr. Jordan's efforts and those of J. L. Weinland, extension worker in the School of Pharmacy at Purdue University, who analyzed these voluminous questionnaires.

Various data from the questionnaire replies are inserted throughout the report wherever it is interesting and valuable to compare the findings in the four test stores with those in other professional pharmacies. A complete report on this questionnaire survey, containing the composite answers to each of the 66 questions, was published by Dr. Jordan in the November 1932 issue of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION. However, the answers

to most of the questions will be found in various sections of this present report, where references are made to the 'questionnaire stores'

#### FIXTURE AND PRESCRIPTION INVENTORY REQUIREMENTS IN OPENING A NEW STORE

The fixture investment was only ascertained for two of the four survey test stores. Store A in 1930 valued its equipment at \$2912 and in 1931 at \$1907, having written off \$1005 because of depreciation. This fixture investment will undoubtedly seem very small for such a professional pharmacy, but it should be remembered that store A has been in business for many years and the fixture investment shown gives the depreciated value. Store B valued its fixtures at \$6236 in 1930 and at \$5873 in 1931 having written off \$363 for depreciation. Store B is a fairly new store and the fixture value shown is probably at a figure somewhat approaching the cost price when purchased.

The minimum fixture investment for 29 of the 35 questionnaire stores averaged \$5064, which seems high. The typical value, however, was \$3000. One professional pharmacist reported a fixture investment as low as \$300, and one over \$15 000. The range was as follows: 13 stores had fixtures valued at from \$300 to \$2500; 6 stores from \$2501 to \$5000; 7 stores, \$5001 to \$10,000; 2 stores from \$10 001 to \$15 000, and one over \$15 000. The fixture investment for both professional and commercial type pharmacies varies greatly. Some conservative proprietors open with a modest investment in fixtures and make improvements as the business warrants them.

In an eastern city there are three professional pharmacies under one management. One of these stores has a fixture and equipment investment of \$5510, made up of the following items: Wooden fixtures (wall cases, show cases, etc.), \$3500; soda fountain and carbonator \$1600; biological refrigerator, \$221; and miscellaneous \$75. The fixture cost in this store was high due to the peculiar shape which made it necessary to make the wooden fixtures to order. The fixtures in the newest of the three stores, a beautiful modern store, amounted to only \$3800, this store not having a soda fountain. The third store had a fixture investment of \$5800.

A modest eight foot mahogany veneer prescription display case used to divide the store front and rear was purchased by one of the 'questionnaire' stores for \$300 at the factory. This sum did not include cases and other fixtures. The proprietor of this quite presentable little professional pharmacy was of the opinion that one could open a professional pharmacy with a fixture investment of as low as \$1000.

*Equipment Necessary for the Prescription Department*—It would require about \$150 to purchase the equipment necessary to stock a prescription department. About half of this sum is taken up by the scales. The laws in different states and cities set up certain minimum requirements for scales sensitivity. Therefore, this is a subject which is not entirely optional with the pharmacist. It would seem, however, that professional pride alone would prompt him to use a scale of unquestioned accuracy. Certain items in the list will seldom be used by the pharmacist, and by some will be deemed of insufficient importance to warrant their purchase. These items are indicated by a footnote. It will be noted that there is no reference in the following list of equipment to the cost of labels, a necessary prescription department expense. This is a matter which will have to be decided by the individual pharmacist. However, it has been observed that pharmacists generally are inclined to spend too much on this item. It is believed that it would be a good policy to purchase in the beginning a very small assortment of labels, allowing future business to dictate the extent of further purchases. No typewriter is included in the list, nor is other office equipment. Many pharmacists purchase a second hand typewriter at the start, which they use until business warrants the purchase of a new one. The list of necessary equipment for the prescription department follows:

Prescription scales, sensitive to 1/8 gr. or 3 mg. (medium price but good)	\$63 00
Dispensing scales (for larger quantities)	22 50
A set of apothecaries' weights (1/8 gr. to 1 oz.)	2 15
A set of metric weights (10 mg. to 50 Gm.)	2 31
A set of at least 5 graduates (60 minim, 4 ounce, 8 ounce, 1 pint and 1 quart)	3 29
A set of at least 2 graduates (125 cc. and 250 cc.)	1 25
Wedgwood mortars and pestles [one No. 2 (16 oz.) at \$1 32 and one No. 10 (10 pints) at \$6 36]	7 68
Glass mortars and pestles, assorted (2 oz. size for \$0 34, 4 oz. at \$0 40, 8 oz. for \$0 55 and	



16 oz for \$0 50, 6 inch for \$0 68 and 8 inch for \$0 84)	2 14
Steel spatulas assorted (3 inch for \$0 38, 5 inch for \$0 50, 6 inch for \$0 68 and 8 inch for \$0 84)	2 40
1 rubber or composition spatula (6 inch for \$0 50)	0 50
Bunsen burner (estimated cost)	1 00
A pill tile (porcelain 10 by 12 inches)	1 80
A pill roller <sup>1</sup>	0 38
A pill finisher (estimated cost) <sup>1</sup>	1 00
A water-bath (estimated cost) <sup>1</sup>	1 00
A set of funnels (2 oz for \$0 14 4 oz for \$0 16 and 8 oz for \$0 22)	0 52
A ring stand or funnel support (estimated cost)	1 00
A percolator (glass—1/ gallon) <sup>1</sup>	1 20
Three stirring rods (6 inch for \$0 02 8 inch for \$0 03 10 inch for \$0 04)	0 09
Filter paper (three packages of different sizes)	2 20
Three flasks (100 cc to 500 cc )	0 64
Two evaporating dishes (diameter 4 inch for \$0 38 and 8 inch for \$0 67)	1 05
All standard sizes of empty capsules (1 box 100 in each of 8 sizes)	1 59
Three boxes of powder papers (two plain and one waved)	1 41
All standard sizes (1/2 oz to 16 oz ) of prescription bottles with good grade corks or other closures (390 bottles in 8 sizes)	9 24
All standard ointment jars (three of each of five sizes ranging from 1/2 oz to 4 oz )	0 64
One dozen ointment tubes small sizes, assorted tips	0 65
One moderately fine sieve <sup>1</sup>	0 75
Two prescription files to hold 500 to 1000 prescriptions	2 50
A poison register	1 25
An exempt narcotic record (estimated cost)	1 00
Pill boxes (9 doz assorted pasteboard, and green glass capsule vials (4 doz ))	3 02
One gross assorted powder boxes (4 sizes)	2 45
Six dozen folding cartons (sizes 1 oz to 16 oz )	0 67
Nine dozen capsule slides (3 sizes assorted)	0 70
<b>Total equipment investment</b>	<b>\$144 97</b>

<sup>1</sup> These items would by some be considered unnecessary

No biological refrigerator has been included in the list of equipment, due to the diversity of opinion on this subject. Some stores opening with a small prescription business purchase a small refrigerator for as little as \$10 or \$25. Others reserve a section of their fountain refrigerator for the storage of biologicals.

The United States Pharmacopœia X specifies that diphtheria and tetanus antitoxins shall be preserved at a temperature between 4.5° and 20° C (40° and 68° F) preferably the lower limit and that smallpox virus be kept at the lowest possible temperature preferably below 0° C (32° F), and never above 5° C (41° F). The same storage conditions should apply to all other biologicals. Some states have regulations covering this phase of biological merchandising. If the dealer has failed to provide proper storage and officials have condemned all or part of his stock of biologicals the manufacturer cannot be expected to reimburse him for the loss. One manufacturer's catalog offers two all steel biological refrigerators: cork insulated with respective capacities of 75 pounds and 150 pounds of ice for \$43.50 and \$67.70 respectively, from the factory.

*The Pharmacist's Library*.—In some states, drug stores are required to possess the current editions of the United States Pharmacopœia and the National Formulary. However, it would seem that the pharmacist would have sufficient pride in his profession to maintain some semblance of a professional library even if not required by law. Most of the survey stores had a fair assortment of reference books and when approached on the subject expressed interest in a list of books which might form a standard pharmacist's library. It is believed that the accompanying list of reference books, a composite list drawn from all of the survey stores, should fill the library requirements of the average drug store even if falling considerably short of some of the excellent libraries possessed by some of the nation's leading professional pharmacists. The pharmacist

should not labor under the delusion that his library is an extravagance. He should consider it a necessary investment, just as necessary as his scales or other prescription equipment. The library will pay dividends, in one way as a safeguard against the possibility of error.

The accompanying list is only supposed to cover the essentials. Those interested will experience no difficulty in adding to the list such books as "Practical Urinalysis and Urinary Diagnosis," Ruddiman's "Incompatibilities in Prescriptions," a book on pharmaceutical Latin, pharmaceutical arithmetic, a manual on toxicology and a local medical directory. It is not necessary to say that the pharmacist should have copies of regulations pertaining to narcotics and intoxicating liquors, and the sanitary code of his particular city. The total cost of the books listed below would be approximately \$75 considering the purchase of only one out of each set of bracketed books, of which the pharmacist should choose one.

Pharmacopœia of the United States <sup>1</sup>	\$4 00
The National Formulary <sup>2</sup>	3 50
New and Non Official Remedies <sup>3</sup>	1 50
Pharmaceutical Recipe Book <sup>2</sup>	5 00
Useful Drugs <sup>4</sup>	0 60
Merck's Index <sup>4</sup>	2 50
The United States Dispensatory <sup>1</sup>	15 00
{ Rumington's Practice of Pharmacy <sup>1</sup> or	10 00
{ Army's Practice of Pharmacy <sup>5</sup> or	8 00
{ Caspari's Practice of Pharmacy <sup>6</sup>	7 50
Pharmaceutical Syllabus	2 25
U S P -N F Prescription Ingredient Survey	2 00
Basic Material for a Pharmaceutical Curriculum <sup>7</sup>	4 00
4000 Years of Pharmacy <sup>1</sup>	5 00
The Art of Compounding <sup>8</sup>	4 00
{ Treatise on Commercial Pharmacy <sup>1</sup> or	4 50
{ Drug Store Business Methods <sup>6</sup>	2 75
The Cost of Medicines <sup>9</sup>	2 50
{ Pharmacotherapy, Materia Medica and Drug Action <sup>10</sup> or	15 00
{ Pharmacology and Therapeutics <sup>5</sup>	7 50

<sup>1</sup> Agent and publisher is the J. B. Lippincott Co., Philadelphia, Pa.

<sup>2</sup> Published by the AMERICAN PHARMACEUTICAL ASSOCIATION, Baltimore, Md.

<sup>3</sup> Published by the American Medical Association, Chicago, Ill.

<sup>4</sup> Published by Merck and Co., Inc., Rahway, N. J.

<sup>5</sup> Published by W. B. Saunders Co., Philadelphia, Pa.

<sup>6</sup> Published by Lea and Febiger, Philadelphia, Pa.

<sup>7</sup> Published by McGraw-Hill Book Co., Inc., New York, N. Y.

<sup>8</sup> Published by P. Blakiston's Son & Co., Inc., Philadelphia, Pa.

<sup>9</sup> Published by the University of Chicago Press, Chicago, Ill. (A brief abstract of this report is available to interested persons upon request to the publishers.)

<sup>10</sup> Published by D. Appleton and Co., New York, N. Y.

*Necessary Financial Outlay in Opening a New Store*—In the last chapter of this report a list of leading chemicals, galenicals, botanicals, etc., based on the study of 20,000 prescriptions, is presented. If only those ingredients which occurred five times or more each in 10,000 prescriptions were purchased on the opening order, the cost would be \$605.77. This is believed to be a sufficient opening stock for the average commercial type drug store, and the basic stock for a professional pharmacy. In fact it is believed that a conservative pharmacist would find the list of ingredients occurring at least ten times each a sufficient opening order for a commercial type pharmacy. These ingredients would have a total cost of only \$387. This information is presented in detail in Chapter VII.

The cost of fixtures and prescription department equipment has been presented above, and it has been seen that a presentable and not under-equipped drug store can be opened for a comparatively small sum, in fact a much smaller sum than is often spent by pharmacists, who are

often inclined to make a large opening investment without waiting to see the amount warranted by the store's progress

As based on experience the 35 "questionnaire" professional pharmacists reported that it would require an average investment of \$7264 to open a professional pharmacy. The typical opinion was that an investment of \$5000 would be sufficient.

#### ASSOCIATION MEMBERSHIP

Membership in professional and trade associations, both national and local, should be indulged in by the pharmacist. Furthermore, he should strive to attend their meetings, for the amount of benefit he derives will correspond to his own participation and contribution. The sum of \$25 a year is not too large for this purpose and should be regarded as a necessary and justifiable expenditure. Seven of the commercial type test store proprietors spent an average of \$54 a year for association dues, one proprietor spending as high as \$160.

#### WINDOW DISPLAYS AND OBSERVANCE OF PHARMACY WEEK

Three of the four professional pharmacies providing the principal test laboratories for this study are located on the ground floor and have show windows. The field force, however, failed to observe more than a minimum attempt to take full advantage of these windows by frequent changes of the display contained therein. The tendency was to place a few ornamental jars containing brightly colored chemicals in the windows and to leave them there.

It was not ascertained to what extent the four St. Louis professional pharmacies studied observed Pharmacy Week. However, 31 of the 35 questionnaire stores answered a question to this effect, 23 of the 31 stating that they did observe Pharmacy Week. However, it is believed that pharmacists as a whole are not observing Pharmacy Week, or installing sufficiently professional and educational window displays, and they are urged to give these subjects further consideration. A national association which for the past several years has published and given to retailers lithographed maps and backdrops, portraying colleges of pharmacy, world distribution of chemicals, botanicals, etc., has found that only 8000 to 10 000 of the approximately 60 000 retail druggists in the country use the material. If all druggists would cooperate, the association would continue the work. But so many druggists have refused to use the material or to join in the observance of Pharmacy Week, that the members of the association have become somewhat discouraged in their effort to aid the retail pharmacist.

#### REQUIREMENTS OF THE PRESCRIPTION CONTAINER

The question as to the advisability of using glass containers or pasteboard boxes for capsules, pills and tablets and various chemicals is not one which lends itself to scientific analysis in this type of a survey. However, as this is a question of considerable interest to the profession, the opinions of several chemical and pharmaceutical manufacturers and others who have sought the answer to this question were obtained.

Proponents of the glass containers maintain that such containers are air tight, and that pasteboard boxes are not; that capsules themselves are not air tight and are subject to deterioration; and that a large number of chemicals are subject to chemical or physical change when coming into contact with moisture, which reaction can only be prevented by the use of air tight glass containers. They further contend that inasmuch as the average druggist is not familiar with all the chemicals affected by moisture, the only safe course is to put up all chemicals, tablets, capsules, etc., in glass containers.

One impartial authority, who has made detailed scientific observations on this subject, says that these conclusions as to the superiority of air tight glass containers over pasteboard boxes are correct, but adds that the cheapness of pasteboard boxes make their use desirable when stable chemicals such as quinine are dispensed. However, with deliquescent chemicals (which are set forth in the U. S. Pharmacopœia) such as potassium acetate, air tight glass containers are indicated according to this authority. He further says that chemicals affected by light and not by the action of air can well be dispensed in opaque pasteboard boxes.

One chemical manufacturer states that the general policy of his firm is to supply chemicals in the most economical package consistent with the requirements for the protection of the particular chemical. Glassware being more expensive, items are only packaged in bottles when

necessary. This manufacturer made a test of more than 600 chemicals for light sensitivity, and submitted a list of 50 chemicals which according to these tests required light protection when supplied in glass containers. However, while the other items may be immune from the composition of light, when mixed together a chemical reaction might take place in the presence of light. Many other chemicals which are light sensitive were not included in the test inasmuch as they are furnished in cans and cartons. It is further suggested that possibly it would be better to package pills and capsules composed of light sensitive items in containers protected from light, which could be a box, a can or a bottle of colored glass although the glass container has a better appearance and possibly is more convenient to use. This manufacturer formerly used amber glass but is now using jet black containers which have proved satisfactory.

The technicians of another manufacturer advise that a pasteboard box for capsules, pills and tablets appears to be more convenient for the consumer than a screw cap bottle that unless the bottle has a wide mouth (is really a jar) it is often difficult to get a capsule out of the bottle, particularly if it sticks. They further state that the theoretical advantage of an air tight glass bottle over a pasteboard box is greatly diminished in the usual practice, when the bottle is opened several times a day. This manufacturer also emphasizes the greater expense of the glass container.

Nine of the 35 questionnaire professional pharmacies used boxes for capsules, pills, etc., 8 used bottles for these items and the other 18 firms used both bottles and boxes. Seventeen firms favored corks, 16 favored screw caps and 2 used both types of closures for bottles. Only 5 of the 35 pharmacies had their name stamped on their bottles.

## CHAPTER I SALES EXPENSE AND PRESCRIPTION BUSINESS IN THE PROFESSIONAL PHARMACY

### SALES EARNINGS AND OPERATING FACTORS IN FOUR PROFESSIONAL PHARMACIES

The sales volume, net profit and operating factors of four professional drug stores are presented in Table I. For Stores A and B the results shown are for the year 1930 as well as for 1931 so that changes over a two year period may be noted. It will be seen that the sales volume in Store A dropped appreciably in 1931 as compared with 1930 while Store B had an almost corresponding increase over the two year period. Note the change in the operating expense and net profit ratios to sales in Stores A and B over the two years. These ratios seem to reflect careful management for in spite of the large decrease in sales in one store and the increase in the other the operating expense was trimmed or expanded so that it maintained an almost constant relationship to sales. The operating expense of these drug stores is broken down into more detail in Table II where it is shown by types of expense.

It is interesting to note the uniformity between the stores as to the gross margin percentages. Only Store C was out of line, its gross margin amounting to only 37.8 per cent of sales, which thus left a much smaller reservoir out of which to pay operating expenses and take a net profit. Nevertheless Store C made a good margin of net profit due to its low cost of operation. In case the average gross margin for these professional pharmacies amounting to 45.7 per cent of sales seems a little low for exclusive prescription pharmacies, it should be remembered that this is the gross margin for the entire business of these stores and not just the prescription business alone. In Store A for example, the nonprescription business amounted to over 40 per cent of the total sales volume as will be seen in Table IV. Although gross margin is an important factor in profit production this table certainly shows that it is not the only important factor.

The case of Store D certainly shows clearly the importance of watching the store's operating expense to keep it trimmed down to a reasonable figure. Store D had the highest gross margin of any of these professional drug stores and yet it produced the smallest margin of net profit only 2.8 per cent of sales. Its turnover was about average so the high operating expense was not due to that factor. Reference to Table II will disclose the types of expense which were unusually high in Store D, running the operating expense up to the point where it consumed 46.4 cents on every dollar of sales. The pharmacist should always keep in mind the fact that every additional dollar of operating expense means that there will be a dollar less of net profit.

The turnover figures shown represent the financial turnover that is the number of times that the money invested in the average inventory was turned during the year 1931. Although it is

generally conceded that a high turnover gives better profit possibilities and is a sign of efficient operation it will be seen that high turnover is not an absolute essential in these professional pharmacies. Store C had the lowest turnover rate and at the same time the lowest operating expense in proportion to sales. However, Store C would undoubtedly benefit by simplification of its inventory and should get rid of many 'dead' items by methods suggested in a later section of this report devoted to inventory simplification. The sales volume of Store C was about the same as that of Store B, and yet Store C's turnover was 1.8 times less per year.

An agency in St. Louis made a study of the operations of 40 commercial type drug stores during 1931. These stores were for the most part located in residential communities, although a few were situated at traffic intersections in business subcenters. These stores had an average annual sales volume of \$32,180, their average gross profit amounted to 32.3 per cent of sales, average operating expense was 31.1 per cent of sales, average net profit, 1.2 per cent of sales, and their average stock turnover 3.1 times a year. It is interesting to compare these operating results with those shown in the table for the four professional stores. The professional stores were certainly operated at greater net profit than these commercial type stores, having an average net profit of over \$10,000 each as compared with an average net profit of only \$383 for the commercial type stores. The gross profit of the commercial type stores was considerably less than in the professional stores but of course the commercial type stores did a much smaller proportion of prescription business with its higher percentage of gross profit.

The questionnaire stores (referred to in the introduction) had a decrease in sales volume in 1931 as compared with 1930 in 20 out of the 32 stores about which this question was answered. The other 12 showed an increase in volume in 1931.

TABLE I—SALES, EARNINGS AND OPERATING FACTORS IN PROFESSIONAL DRUG STORES

Store	Annual Sales Volume	Turnover	Per Cent of Total Sales Volume.		
			Gross Margin	Operating Expense	Net Profit
A (1930)	\$136,928	<sup>1</sup>	46.2	34.6	11.6
A (1931)	123,321	3.6	46.5	36.2	10.3
B (1930)	92,863	<sup>1</sup>	47.7	37.0	10.7
B (1931)	107,425	4.4	47.9	34.1	13.8
C (1931)	106,678	2.6	37.8	27.8	10.0
D (1931)	78,142	3.2	49.2	46.4	2.8
Average	\$107,560	3.3	45.7	35.5	10.2

<sup>1</sup> The turnover for 1930 was not obtained.

#### OPERATING EXPENSE BREAKDOWN IN PROFESSIONAL DRUG STORES

The breakdown of operating expense into the various types of expense making up the total is shown in Table II. Operating expense is shown in this table as a percentage of the sales volume of the particular store concerned in order that comparison may be made between the stores. The operating expense summary is given for four professional pharmacies for the year 1931, and in order that a two year period can be noted the expense summary for 1930 is also given in the case of Stores A and B. This latter comparison shows some interesting facts, in view of the fact that the sales volume of Store A decreased about \$13,600 in 1931 over 1930 while during the same period Store B showed an increase in sales amounting to about \$14,500. It is interesting to note which expenses maintain a constant ratio to sales and which increase or decrease in the face of increased or decreased sales volume. It should be mentioned that this expense summary was obtained from the operating statements of the stores concerned and in some cases the grouping of expenses in one store did not exactly correspond with another. For example while Stores A and B showed 'laundry' as a separate item, Stores C and D grouped this cost under 'general expenses'.

It will be seen that Store C had by far the lowest operating expense ratio to sales. This was partly due to the fact that its salary cost was low particularly 'officers' salaries' but even if this cost was raised to the average the total expense ratio of Store C would remain the lowest. This low operating cost enabled Store C to make a good net profit in spite of a gross margin considerably below the other stores.

Of course the outstanding expense items are salaries, rent and delivery expense. The last column in the table shows the per cent of the total expense accounted for by each type of expense. It will be seen that 60.3 per cent of the cost of operating the professional pharmacies was accounted for by salaries, 13.9 per cent by rent and 11.8 per cent by delivery expense.

In Store A for 1931, officers' salaries showed a large increase and employees' salaries a corresponding decrease over the previous year. This is due to the fact that certain members of the staff who in 1930 were classified as employees were made officers of the firm in 1931, so that their salaries were placed under officers' salaries in the latter year. This was done to secure a lower rate on employees' compensation insurance.

In case the delivery expense in Stores C and D seems surprisingly low as compared with Stores A and B, it should be remembered that Stores A and B placed drivers and delivery boys' wages under delivery rather than under salaries, thus raising the delivery expense item considerably.

The advertising expense of Store D is many times greater than in the other stores. More money was spent on advertising in Store D than was spent for rent. Less than one third of this advertising expense was due to the cost of prescription blanks. The store advertised in the newspapers and circularized doctors as a part of its advertising campaign. The total operating expense in Store D was considerably higher than that of any of the other stores, this high expense being caused principally because of the high salary and advertising costs. In view of the fact that the net profit in Store D amounted to only 2.8 per cent of sales, it would ordinarily seem that the advertising expense amounting to 6.4 per cent of sales was a sign of inefficient management. However, it might prove to be a reasonable expenditure if the proprietor of the store purposely sacrificed present earnings in order to build up a large volume in the future. If Store D had this purpose, the expenditure may be justified. Store D had the smallest volume of the four professional stores in spite of the fact that it has been in business for eight years, this being the fourth year in its present location. But such a large advertising expense would not be justified just for the present business it brings in.

Note that the delivery expense in Store A was not pared down in 1931, so in view of decreased sales volume its percentage of sales was considerably higher in 1931. In Store B the amount spent for delivery in 1930 seemed to be sufficient to provide delivery service for the increased sales of 1931, so the delivery expense percentage was lower in 1931.

It is interesting to compare the operating expense of these professional pharmacies with that of the 40 commercial type drug stores referred to earlier. The operating expense of these 40 stores averaged 31.1 per cent of sales. Owner's salary amounted to 7.7 per cent of sales, wages averaged 11.2 per cent of sales, rent averaged 5.1 per cent of sales, advertising 1.1 per cent of sales and miscellaneous expense (including taxes, insurance, repairs, depreciation, and heat, light and power, etc.) averaged 6 per cent of sales. Delivery expense was not shown for the 40 commercial type drug stores, but in 10 other similar stores it was found to be a negligible expense, amounting to only one tenth of 1 per cent of sales.

Thus, almost the entire difference in expense between the professional and commercial type pharmacies is accounted for by the heavy delivery expense of the professional pharmacies. Owner's salary, wages and advertising expense were slightly higher in the professional stores, and rent was slightly lower, while miscellaneous expense was considerably lower in the professional stores, when considered as a percentage of sales volume.

While the per cent of rent to sales was only slightly lower in the professional pharmacies, it should be kept in mind that these commercial type stores were located in residential communities and subcenters, thus having a lower percentage of rent. The professional stores, on the other hand, were located in the heart of the theater district uptown, where rents are considerably higher. Thus, it is more practical to compare the professional store rents with rents of commercial type stores located in the same section of the city, which had an average rent amounting to 6.6 per cent of sales volume.

Inasmuch as the professional pharmacy does not generally have to depend on transient trade, it would seem unnecessary for them to occupy premises in a location which has high priced rentals. The four pharmacies studied in this report located in this expensive district due to the fact that many physicians have offices in this district, and not because of the transient trade which comes to a business center. As is shown later in this report, much of the business of the profes-

sional pharmacy is received by telephone, the prescriptions being delivered to the patient so that these customers actually visit the store only on rare occasions. Professional pharmacies can locate on upper floors not requiring the more expensive ground floor space and at locations somewhat removed from the heart of the business district and save a considerable amount on rent, and yet not lose much of their potential business. The professional pharmacy generally locates in a building devoted to doctors' offices or at least nearby but generally physicians do not cluster in a high rental business district as did these physicians in St. Louis.<sup>1</sup>

The questionnaire stores (the 35 professional pharmacies referred to in the introduction) paid rent averaging 6.5 per cent of sales, the range being from 3 to 11 per cent of sales. It is interesting to note that the store paying the highest rent, \$1000 a month, was second lowest when rent is considered as a per cent of sales, its rent amounting to only 3.5 per cent of sales. Of the 35 stores, 24 have stores on the ground floor and 11 have stores upstairs. Sixteen of the 35 questionnaire stores are located in medical arts buildings.

TABLE II — BREAKDOWN OF OPERATING EXPENSE IN PROFESSIONAL DRUG STORES

Type of Expense	Per Cent of Total Sales Volume							Per Cent of Total Expense All Stores
	Store A (1930)	Store A (1931)	Store B (1930)	Store B (1931)	Store C (1931)	Store D (1931)	Average	
Salaries	21.07	21.81	20.29	19.11	17.42	31.06	21.38	60.3
Officers	3.45	12.32	10.88	9.54	5.62	14.62	8.94	25.2
Employees <sup>1</sup>	17.62	9.49	9.41	9.57	11.80	16.44	12.44	35.1
Rent	3.29	3.65	7.75	6.70	4.91	4.10	4.93	13.9
Power Heat Light etc	0.33	0.36	0.48	0.38	0.53	0.59	0.43	1.2
Delivery	5.62	6.20	5.16	4.55	0.82	1.40	4.18	11.8
Advertising	0.96	0.96	0.47	0.50	0.63	6.40	1.42	4.0
General	0.45	0.48			0.58	4.43	0.82	2.3
Prescription Blanks <sup>2</sup>	0.51	0.48	0.47	0.50	0.05	1.97	0.60	1.7
Telephone and Telegraph	0.40	0.42	0.44	0.36	0.49	0.40	0.42	1.2
Insurance	0.61	0.49	0.34	0.33	0.80	0.31	0.50	1.4
Interest					0.10		0.02	0.05
Depreciation	0.72	0.82	0.38	0.34	0.73	0.37	0.59	1.7
Laundry	0.15	0.20	0.25	0.29			0.16	0.4
Taxes and Licenses	0.30	0.32	0.25	0.19	0.22	0.32	0.27	0.8
Postage	0.10	0.10	0.08	0.13	0.78		0.20	0.6
Amortization of Leasehold			0.54	0.47			0.15	0.4
General Expenses <sup>4</sup>	1.06	0.89	0.56	0.75	0.38	1.40	0.83	2.3
Total Operating Expense	34.61	36.22	36.99	34.10	27.81	46.35	35.48	100.0

<sup>1</sup> In Stores A and B this item does not include drivers' and delivery boys' wages which are placed under Delivery.

<sup>2</sup> Includes donations.

<sup>3</sup> Stores C and D designated this item as stationery and printing.

<sup>4</sup> Includes such items as repairs, freight and express and in Stores C and D laundry.

<sup>5</sup> Less than  $\frac{1}{100}$  of 1%.

#### PRESCRIPTION BUSINESS RECEIVED BY TELEPHONE

Store A has three telephones at an average expense of \$14 each per month. About 15 per cent of this store's prescription business is received over the telephone from physicians. About 30 per cent of the total prescription business consists of refills telephoned in by customers and delivered to them. This store does not have private lines to the offices of physicians and the

<sup>1</sup> Information of this type can be obtained by consulting the Store Location Studies conducted in connection with the National Drug Store Survey.

proprietor does not believe this expense would be justified. About the same situation is reported for Store B, which had three telephones including one coin telephone.

Store C has six telephones, two of which are coin telephones, and the total telephone bill amounts to about \$36 a month. From 15 to 20 per cent of the total prescription business comes by telephone, according to the proprietor's estimate. This store has private lines to the offices of two physicians, but the proprietor does not believe that the expense is justified.

Store D has two telephones which cost about \$14 each and one pay station which does not cause the store any expense. The prescription business received by telephone in this store is very important as it amounts to about 50 per cent of the total prescription business. This store has no private lines to physicians' offices. As to whether or not private telephones of this sort are justified, the proprietor makes reference to a pharmacy in Louisville which gave this scheme a year's trial and then abandoned it.

Four of the questionnaire stores had direct telephone lines to physicians' offices and in three of these cases it was reported that the cost was warranted. Thirty or 88.2 per cent of the 34 stores concerning which this question was answered did not maintain such private telephone lines. As an average for 32 questionnaire stores, 26.6 per cent of their prescription business was received by telephone, and 29.9 per cent of the prescriptions filled were delivered.

#### TIME STUDY OF PRESCRIPTION BUSINESS IN THREE PROFESSIONAL PHARMACIES

The following table is presented to give a picture of the flow of the prescription business in three professional pharmacies, according to various periods of the day from the time they opened until they closed in the evening. In Stores A and C the period from 3:00 to 6:00 P. M. had the largest number of prescriptions, but the two preceding periods, from 11:00 A. M. to 1:00 P. M. and from 1:00 to 3:00 P. M. really had the heaviest volume inasmuch as each of these periods is only two hours in length as compared with the three hours between 3:00 and 6:00 P. M. In Store D the two periods running from 11:00 A. M. to 3:00 P. M. were clearly outstanding.

In Stores A and C, the opening period from 8:00 to 11:00 A. M. and the closing period from 6:00 to 9:00 or 10:00 P. M. both being at least three hour periods, clearly had the highest volume of prescription business. In Store D the closing period from 6:00 to 10:00 P. M. had the highest volume, but the opening period in the morning had quite heavy volume. Thus it can be said that the professional pharmacy generally speaking will have its heaviest volume of prescription business from 11:00 A. M. to 3:00 P. M. and its lightest volume in the evening after 6 o'clock and during its opening period in the morning. Of course, in individual cases, such factors as store location may vary the time of day in which business is heaviest, but as professional pharmacies generally have a central location, most of them will probably encounter the same conditions as are shown in the table.

It will be seen that the delivery service is an important factor in the professional pharmacy. From 26 per cent (in Store C) to 43.6 per cent (in Store D) of the prescriptions were delivered. This, of course, represents an element of expense which must be taken into account when considering the profit possibilities of the professional pharmacy.

In Stores C and D, the Sunday hours were only half as long as the other days of the week, but the prescription business amounted to less than one third of the usual daily volume. Store A was open from 9:00 A. M. to 4:00 P. M. However, practically the entire Sunday prescription work in this store is done within a three hour period from 10:00 A. M. to 1:00 P. M. It will be seen that it is not so essential for the professional pharmacy to keep the long hours kept by the commercial type drug store and that it is not the prescriptions which are responsible for the long business day of the commercial type pharmacy. Students of pharmacy who feel a repugnance to the long 14, 16 and 18 hour days of the commercial type pharmacy will be drawn to the professional pharmacy, where the hours are generally shorter and in many cases could be made even shorter by closing after 6:00 P. M. and on Sundays when the volume of prescription business is so light that there is no necessity of remaining open. In many cases it would probably be more profitable to close the establishment than to keep it open in the evening and on Sunday, in view of the light volume of prescription business. It is not unreasonable to suppose that shorter hours in the drug business would attract a desirable type of young men.

The week considered for Store A was in April 1932 while a week in April 1933 was the time when this study took place in Stores C and D. The proprietor of Store D stated that business



in that store was at a low ebb during the week of this study and that the volume would normally be 20 per cent greater. The entire month of April 1932 was studied in Store A but for the first week refills were not considered. When refills were considered the entire volume showed a considerable increase. The first period of the day, from 8 00 to 11 00 A M, seemed to be the most affected by the inclusion of refills in the study, leading to the conclusion that the greater portion of this early morning business was occasioned by fairly regular customers bringing in prescriptions to be refilled while on their way to work.

As for the questionnaire stores, while there was a wide variation in the time at which these stores open and close, the majority opened at 8 00 A M and closed at 10 00 P M on week days while the average Sunday hours are from 9 00 A M to 9 00 P M. Two of the stores do not open on Sunday. As for the Sunday prescription business, 1 store reported that it is heavy, 3 that it is good, 5 that it is only fair and 24 that it is poor.

TABLE III—PRESCRIPTION BUSINESS IN THREE PROFESSIONAL PHARMACIES ACCORDING TO THE TIME OF DAY IN WHICH THEY WERE FILLED

Day	Number of Prescriptions Including Refills and Percentages by Time of Day												Num ber of Deliver ies
	8 to 11 A M Num ber	Per Cent	11 A M to 1 P M Num ber	Per Cent	1 to 3 P M Num ber	Per Cent	3 to 6 P M Num ber	Per Cent	6 to 9 P M <sup>1</sup> Num ber	Per Cent	Total Day Num ber	Per Cent	
Store A													
Monday	28	13.9	46	22.9	47	23.4	62	30.8	18	9.0	201	100.0	51
Tuesday	41	20.0	43	21.0	46	22.4	57	27.8	18	8.8	205	100.0	62
Wednesday	31	19.1	36	22.2	37	22.8	40	24.8	18	11.1	162	100.0	62
Thursday	20	11.0	39	21.6	41	22.7	61	33.7	20	11.0	181	100.0	53
Friday	36	19.4	36	19.4	35	18.8	60	32.3	19	10.1	186	100.0	50
Saturday	19	8.8	47	21.9	78	36.3	46	21.4	25	11.6	215	100.0	60
Sunday <sup>2</sup>	50	100.0									50	100.0	16
Average daily <sup>3</sup>	29	15.1	41	21.4	48	25.0	54	28.1	20	10.4	192	100.0	56
Store C													
Monday	41	19.6	39	18.7	47	22.5	51	24.4	31	14.8	209	100.0	62
Tuesday	24	14.5	41	24.7	33	19.9	45	27.1	23	13.8	166	100.0	45
Wednesday	32	17.6	38	20.9	37	20.3	43	23.6	32	17.6	182	100.0	43
Thursday	29	16.3	42	23.6	39	21.9	38	21.3	30	16.9	178	100.0	47
Friday	30	15.1	40	20.1	45	22.6	49	24.6	35	17.6	199	100.0	43
Saturday	33	15.0	37	16.8	51	23.1	56	25.5	43	19.6	220	100.0	59
Sunday <sup>4</sup>	53	100.0									53	100.0	23
Average daily <sup>3</sup>	32	16.7	39	20.3	42	21.9	47	24.5	32	16.6	192	100.0	50
Store D													
Monday	26	20.5	25	19.7	25	19.7	25	19.7	26	20.4	127	100.0	65
Tuesday	22	19.0	37	31.9	28	24.1	20	17.2	9	7.8	116	100.0	43
Wednesday	24	21.6	27	24.3	30	27.0	20	18.0	10	9.1	111	100.0	46
Thursday	25	24.0	34	32.7	35 <sup>5</sup>	33.7 <sup>5</sup>	<sup>5</sup>	<sup>5</sup>	10	9.6	104	100.0	43
Friday	32	32.7	21	21.4	20	20.4	15	15.3	10	10.2	98	100.0	44
Saturday	29	27.4	28	26.4	33	31.1	10	9.4	6	5.7	106	100.0	47
Sunday <sup>4</sup>	33	100.0									33	100.0	
Average daily <sup>3</sup>	26	23.6	29	25.5	28	26.4	15	13.6	12	10.9	110	100.0	48

<sup>1</sup> This period is from 6 00 to 10 00 P M in Stores C and D.

<sup>2</sup> Total day open from 9 00 A M to 4 00 P M only.

<sup>3</sup> Sunday not included.

<sup>4</sup> Total day, open from 9 00 A M to 4 00 P M only.

<sup>5</sup> Prescriptions filled from 1 00 to 3 00 P M and from 3 00 to 6 00 P M are grouped together.

#### SHARE OF THE PRESCRIPTION DEPARTMENT IN SALES VOLUME

As an average for the four professional stores purely prescription business represented 73.13 per cent of total sales volume as will be seen in Table IV. In the 13 commercial type drug stores

as reported in the first prescription department report the prescription sales volume averaged only 16.39 per cent of total store sales volume.

Stores A and B did not keep a record of their refill prescriptions at the time when the prescriptions studied were filled. However they have since recognized the importance of such records for efficient operation of the department and kept a daily record of refills for several months. On the basis of these records there are estimated to be about 50 per cent as many refills as new nonnarcotic prescriptions in Stores A and B. In the case of Store D, refills were estimated to represent one third of the total number of prescriptions filled and narcotics were estimated to amount to 7½ per cent of all prescriptions filled. However, in Store C the figures given for all types of prescriptions are based on an actual count of the prescriptions.

To determine the dollar sales volume for each type of prescription the number of prescriptions filled was multiplied by the average price of prescriptions of that type. The average prices of the different types of prescriptions in each store were determined by the study of a large number of sample prescriptions. Thus, while the percentages of sales volume accounted for by the different types of prescriptions as shown in Table IV are estimated figures, the method used in estimating them is believed to be of sufficient accuracy that there is no important variation from the actual figure, which it was impractical to obtain.

While the sales volume from liquor prescriptions amounts to a considerable proportion of the total sales of these stores, it should be remembered that the high average price per liquor prescription enables a relatively small number of prescriptions to bring in a large volume of sales. For example, in Store D regular prescriptions brought in 52.17 per cent and liquor prescriptions 27.27 per cent of the total sales volume. Yet Store D filled only 7103 liquor prescriptions as compared with 40,886 regular prescriptions.

Store A had the largest proportion of sales volume coming in from other than prescriptions. The proprietor of this store estimates that about one-third of this nonprescription business is in packaged medicines and goods and the other two thirds in hospital supplies. None of these four stores had a soda fountain or carried tobacco or candy, and only a skeleton line of toiletries. Therefore, the 26.87 per cent of the business not accounted for by prescriptions mostly represents hospital and surgical goods, physicians' supplies, infant and invalid foods, biologicals, proprietaries and other items related to public health.

In the questionnaire stores (referred to in the introduction) on the average, 63 per cent of the total business was in prescriptions and the other 37 per cent nonprescription business. The typical proportion of the business accounted for by prescriptions, however, was 70 per cent. Only 25 of the 35 questionnaire stores answered this question. Nineteen of these stores sold patent medicines, while 16 did not. Seventeen operated soda fountains and sold candy, tobacco and toilet preparations while 18 did not carry these nonprescription lines.

TABLE IV—SHARE OF PRESCRIPTION DEPARTMENT AND CERTAIN TYPES OF PRESCRIPTIONS IN TOTAL SALES VOLUME OF PROFESSIONAL STORES

Store	Total Store Annual Volume	Per Cent of Total Store Sales Volume					
		All Prescriptions	Liquor Prescriptions	Regular Prescriptions	Regular Prescriptions Consisted of—		
					Narcotics	New Nonnarcotics.	Refills
A	\$135,398 <sup>1</sup>	59.06	9.70	49.36	4.54	29.88	14.94
B	99,415 <sup>1</sup>	71.76	17.22	54.54	4.20	33.56	16.78
C	106,678	87.66	19.50	68.16	7.75	40.70	19.71
D	78,142	79.44	27.27	52.17	3.77	30.96	17.44
Ave	\$104,908	73.13	17.24	55.89	5.13	33.71	17.05

<sup>1</sup> The 12-month period considered for Stores A and B was from May 1, 1930 to May 1 1931. (In the other two stores the calendar year 1931 was the period studied.)

#### NUMBER OF PRESCRIPTIONS FILLED DAILY AND ANNUALLY, BY TYPE OF PRESCRIPTION

The four professional pharmacies filled from 112 to 219.4 prescriptions, exclusive of liquor each day. Comparatively few liquor prescriptions were filled by these stores, ranging from only 12 to 19.5 each per day. As Store A had eight registered graduates, each employed full time, and

no part-time employees, it will be seen that each would have to fill an average of 28 prescriptions per day, exclusive of liquor prescriptions. Store B had six full time employees, and they would also average 28 prescriptions each per day. However, in each of these stores, one clerk handles all manufacturing of galenicals and other preparations, which consumes about half of his time so that much clerical time would not be available for filling prescriptions. The proprietors of Stores A and B state that all of their clerks are necessary and are kept busy.

The questionnaire professional stores filled an average of 73 prescriptions each per day. Only 5 of the 33 proprietors answering this question stated that their stores filled more than 100 prescriptions daily, these 5 stores filling from 100 to 250 prescriptions each a day. These stores employ an average of 2.8 registered pharmacists and 5.5 nonregistered employees, an average of 8.3 employees per store. Nineteen stores have not reduced personnel during the depression, while 13 stores have reduced personnel.

The 13 commercial type drug stores studied and reported on in the first publication on the prescription phase of this study, filled an average of 15.3 regular prescriptions daily (1.7 narcotics, 9.7 new nonnarcotics and 3.9 refills) and 2.3 liquor prescriptions per day each. It is interesting to compare this showing for commercial type drug stores with the large daily volume of prescription business in the four professional pharmacies.

TABLE V—NUMBER OF PRESCRIPTIONS FILLED, BY TYPES DURING A YEAR, AND DAILY AVERAGE OF EACH

Type of Prescription	Number of Prescriptions Filled							
	Store A		Store B		Store C		Store D	
	Yearly Total	Daily Average	Yearly Total	Daily Average	Yearly Total	Daily Average	Yearly Total	Daily Average
Narcotics	7,576	20.8	4,448	12.2	8,348	22.9	3,066 <sup>2</sup>	8.4 <sup>2</sup>
New Nonnarcotics	48,334	132.4	37,660	103.2	47,779	130.9	24,191	66.3
Refills	24,167 <sup>1</sup>	66.2 <sup>1</sup>	18,830 <sup>1</sup>	51.6 <sup>1</sup>	23,623	64.7	13,629 <sup>2</sup>	37.3 <sup>2</sup>
Total Regular Prescriptions	80,077	219.4	60,938	167.0	79,750	218.5	40,886	112.0
Liquor	4,378	12.0	5,705	15.6	6,933	19.0	7,103	19.5
Total, All Prescriptions Including Liquor	84,455	231.4	66,643	182.6	86,683	237.5	47,989	131.5

<sup>1</sup> Estimate based on actual records kept since the field work on this survey.

<sup>2</sup> Proprietor's estimate.

NOTE: The year concerned for Stores A and B was from May 1, 1930 to May 1, 1931, for Stores C and D the calendar year 1931 was studied.

#### PRESCRIPTION BUSINESS BY TYPE OF PRESCRIPTION IN 1910, 1920 AND 1930

Table VI shows the breakdown of prescriptions both narcotic and nonnarcotic, into official, mixed and specialty types in professional Stores A and B. A sample lot of prescriptions in each store serves as the basis of this analysis. In order to note any changes in the use of these different types of prescriptions over the past two decades, 1000 prescriptions filled by Store A in 1910, and another 1000 prescriptions filled by this store in 1920, were included in the study. The sample for 1930 consisted of 5170 prescriptions filled by Store A and 3500 filled by Store B.

It will be seen that there is little difference in the proportion of the total prescription business accounted for by each of the three types of prescriptions—official, mixed and specialty—between the two stores or within Store A in the three different periods. Despite the frequently asserted statement that specialty prescriptions have been supplanting official prescriptions, it will be seen that official prescriptions decreased only 2.2 percentage points from 1910 to 1930, while specialties also showed a decrease of 1.3 percentage points in the same period and mixed prescriptions show an increase of 3.5 percentage points. Approximately 25 per cent or slightly less than one out of four of the prescriptions included in this study for the twenty-year period called exclusively for specialties. This finding will come as a surprise to many members of the profession.

The decrease, although slight, was constant for both types of prescriptions, mixed prescriptions gaining the ground lost by the other two types. However, in Store B in 1930, official and

specialty prescriptions each represented a higher proportion of the total prescription business than they did in Store A for their high year, 1910. Therefore, it can be said that regardless of the store or the year, in the two stores studied official prescriptions represented a little more than half of the total prescription business when both narcotic and nonnarcotic prescriptions are considered, mixed and specialty prescriptions dividing the other half of the total about equally.

Of course as might be expected, there were few narcotic specialty prescriptions, so official and mixed prescriptions had a resultant higher proportion of the total when narcotics alone are considered. It is not possible to show narcotics and nonnarcotics separately for 1910, as the Federal narcotic law was not in effect at that time and narcotics were not distinguished between or filed separately.

TABLE VI—PRESCRIPTION BUSINESS BY TYPES OF PRESCRIPTIONS<sup>1</sup>

Prescriptions Studied	Types of Prescriptions							
	All Prescriptions Number	Per Cent of Total	Official Number	Per Cent of Total	Mixed Number	Per Cent of Total	Specialties Number	Per Cent of Total
Store A (1910)	1000	100 0	531	53 1	233	23 3	236	23 6
Store A (1920)								
Narcotic	150	100 0	76	50 7	60	40 0	14	9 3
Nonnarcotic	850	100 0	444	52 2	189	22 3	217	25 5
Total	1000	100 0	520	52 0	249	24 9	231	23 1
Store A (1930)								
Narcotic	1078	100 0	778	72 2	259	24 0	41	3 8
Nonnarcotic	4092	100 0	1856	45 4	1127	27 5	1109	27 1
Total	5170	100 0	2634	50 9	1386	26 8	1150	22 3
Store B (1930)								
Narcotic	500	100 0	347	69 4	119	23 8	34	6 8
Nonnarcotic	3000	100 0	1527	50 9	627	20 9	846	28 2
Total	3500	100 0	1874	53 6	746	21 3	880	25 1

<sup>1</sup> Private formula prescriptions not considered in this table

#### PRESCRIPTION BUSINESS BY FORM OF PRESCRIPTION

It is interesting to see the proportion of the prescription business represented by different forms of prescriptions. Table VII shows that over half of the prescriptions studied for 1930 were liquids. However, liquids were not quite as important in 1930 when they represented 52.65 per cent of the prescriptions studied, as they were in 1920 and 1910 when they accounted for about 64 per cent of the prescriptions studied. This loss by liquids was taken up by a gain in use for capsules and tablets over the 20-year period. Tablets showed a steady increase representing only 5.9 per cent of the prescriptions filled in 1910 but 9 per cent in 1920 and 13.5 per cent in 1930. Capsules did not show a gain in use from 1910 to 1920, but showed a considerable increase in 1930. The percentage for liquids showed a much greater drop for nonnarcotics than narcotics although the latter was considerable.

Although not as important, it might be noted that bulk powder showed a steady increase, its percentage of the total being twice as great in 1930 as in 1910. Other than liquids, the two forms showing the greatest decrease in use were divided powders and pills. Most of the decrease for divided powders occurred between 1910 and 1920.

For comparison with this showing for prescriptions filled in professional drug stores it is noted that in the case of 23,963 prescriptions filled by 13 commercial type drug stores in 1930, published in the first report on the prescription phase of the National Drug Store Survey, liquids represented 61.3 per cent of the prescriptions studied, capsules 17.5 per cent, tablets 9.9 per cent and ointment only 3.8 per cent. It will be seen that tablets and ointment had a less important part in the commercial type drug stores than in the professional stores, while the reverse was true for liquids.

Colleges of pharmacy might make good use of the findings shown in this table in allocating work to students. The increased use of tablet prescriptions can probably be accounted for by

specialty prescriptions The increased popularity of glandular products would partially, but not entirely account for the increase in the use of capsules A number of manufacturers are featuring products packed in capsules and encouraging physicians to write for these under names that will designate them as the product of an individual manufacturer, and this is undoubtedly responsible in large part for the increased use of capsules (See later sections of this report entitled "Specialty Capsule Prescriptions" and "Introduction of New Manufacturers' Specialties" which give information concerning the form of recent remedies placed on the market)

TABLE VII — PRESCRIPTION BUSINESS BY FORM OF PRESCRIPTION IN 1930 1920 AND 1910

Form of Prescriptions	Stores A and B (1930) <sup>1</sup>					
	Narcotic		Nonnarcotic		All Prescriptions	
	Number of Prescriptions	Per Cent of Total	Number of Prescriptions	Per Cent of Total	Number of Prescriptions	Per Cent of Total
Liquid	949	60 14	3616	50 99	4565	52 65
Capsules	337	21 36	1258	17 74	1595	18 40
Tablets	223	14 13	951	13 41	1174	13 54
Ointment	27	1 71	704	9 93	731	8 43
Bulk Powder			198	2 79	198	2 28
Divided Powders	13	0 82	126	1 78	139	1 60
Pills	4	0 25	95	1 34	99	1 14
Effervescent Salts			55	0 77	55	0 64
Suppositories	19	1 21	25	0 35	44	0 51
Ampuls	1	0 06	17	0 24	18	0 21
Lozenges			20	0 28	20	0 23
All Other	5	0 32	27	0 38	32 <sup>2</sup>	0 37
Total	1578	100 00	7092	100 00	8670	100 00

Form of Prescriptions	Store A (1920)				All Prescriptions		Store A (1910)		
	Narcotic		Nonnarcotic		Number of Prescriptions	Per Cent of Total	All Prescriptions		Per Cent of Total
	Number of Prescriptions	Per Cent of Total	Number of Prescriptions	Per Cent of Total			Number of Prescriptions	Per Cent of Total	
Liquid	103	68 67	545	64 12	648	64 80	637	63 70	
Capsules	19	12 67	99	11 65	118	11 80	120	12 00	
Tablets	20	13 33	70	8 23	90	9 00	59	5 90	
Ointment	2	1 33	75	8 82	77	7 70	85	8 50	
Bulk Powder			16	1 88	16	1 60	11	1 10	
Divided Powders	3	2 00	16	1 88	19	1 90	42	4 20	
Pills			20	2 35	20	2 00	26	2 60	
Effervescent Salts			4	0 47	4	0 40	7	0 70	
Suppositories	3	2 00			3	0 30	6	0 60	
Ampuls			2	0 24	2	0 20			
All Other			3	0 36	3 <sup>3</sup>	0 30	7 <sup>4</sup>	0 70	
Total	150	100 00	850	100 00	1000	100 00	1000	100 00	

<sup>1</sup> Does not include the 304 private formula prescriptions

Includes the following prescription forms Narcotics, *units* five times, nonnarcotics, *granules* 11 times, *pearls* 7 times, *seed* 4 times, *pessaries* twice and *soap cubes* and *plaster* each one time

<sup>3</sup> Includes *Granules* twice and *tampons* once, all nonnarcotic

<sup>4</sup> Includes *Plasters* twice, *paste* twice and *granules tampons* and *konsel* each once

## CHAPTER II SEASONAL DEMAND FOR PRESCRIPTIONS

Most manufacturers find that the slow or dull season for pharmaceuticals is during the summer months, due to the fact that there is less sickness in this season, this business generally increasing with the advent of fall Table VIII shows this seasonal trend clearly the volume in

both stores taking a considerable drop in the summer months, while the heaviest business was in the winter. While the usual commercial type drug store maintains its volume in the summer due to increased volume at the fountain and some other departments, the professional pharmacy does not have this diversification in types of products carried, so its total volume reflects the decreased volume in prescriptions and other lines connected with public health.

Health conditions of the country during the period covered by this survey were the best known for some time. As the pharmaceutical industry is governed more by public health conditions than by general business influences, the loss in volume during the current depression which has been less than that suffered by most industries is more directly traceable to the good health conditions than to any other cause. The reputed general betterment of the public health must be taken into account when considering the future of prescription shops.

However, the proprietor of the professional pharmacy can profitably use any idle time which might accrue in the summer months, particularly August. Certain galemeals and other preparations can be manufactured for winter use. The spare time of the proprietor, or some other qualified person, can be utilized by detouring physicians and acquainting them with the store's services and products. This is also a good time to take inventory and to grant vacations to the members of the staff.

TABLE VIII —TOTAL VOLUME OF SALES IN TWO PROFESSIONAL PHARMACIES, BY MONTHS  
1930

Month	Store A	Store B
May	\$11 552	\$7772
June	11 374	7612
July	10 610	7561
August	9 729	6780
September	10 661	7048
October	11 222	8156
November	11 036	8112
December	11,856	8205
1931		
January	12 832	9477
February	11 432	9816
March	11,909	9307
April	11 185	9569
Total	\$135 398	\$99 415

#### SEASONAL DEMAND FOR REGULAR PRESCRIPTIONS

The month by month volume of regular prescriptions (those other than liquor) is shown for four professional stores in Table IX. The calendar year 1931 is reported for Stores C and D and a twelve month period starting May 1, 1930, is reported for Stores A and B. The fact that part of the months concerned are in 1930 for Stores A and B, and 1931 for the other two stores, makes no material difference. Thus the total figure groups the prescription business by months, regardless of the year concerned.

The regular prescriptions tabulated in this table include both narcotics and nonnarcotics, and for Stores C and D refills also. In all four professional stores, the months January through April had the heaviest volume, although May was also a heavy month in the case of Store A, and September through December also carried a heavy volume in Store C. The summer and late spring months were the lightest in all of these stores.

The last column of the table shows the proportion of the total number of regular prescriptions filled by the four professional stores falling into each month of the year. It will be seen that July, August and September were the three lightest months. These are the same months in which the total store sales volumes of Stores A and B were lightest, as shown in Table VIII.

For eight commercial type drug stores, reported on in the first publication on the prescription phase of the National Drug Store Survey, the three outstanding months as to number of regular prescriptions filled were February, January and March, respectively. Over 11 per cent of the

total number of regular prescriptions filled by these eight commercial type drug stores during the year studied were filled in February, 10.98 per cent in January and 9.65 per cent in March. It is interesting to compare these commercial type store results with those for the four professional stores.

TABLE IX.—SEASONAL VOLUME OF REGULAR PRESCRIPTION BUSINESS IN FOUR PROFESSIONAL PHARMACIES <sup>1</sup>

Date. (1930)	Number of Prescriptions (Not Including Refills)		Date (1931)	Number of Prescriptions (Refills Included)		Month	Per Cent of Total in 4 Stores by Months Regardless of the Year
	Store A	Store B		Store C	Store D		
May	5066	3235					
June	4788	2966	January	6846	3960	January	9.56
July	4412	2908	February	6195	3838	February	8.75
August	3950	2676	March	7817	3894	March	9.59
September	4309	2855	April	7132	3706	April	8.91
October	4551	3314	May	6484	3548	May	8.38
November	4343	3203	June	6339	3392	June	8.00
December	4772	3552	July	5491	3237	July	7.34
(1931)			August	5327	2770	August	6.73
January	5323	4777	September	6578	3006	September	7.66
February	4792	4306	October	7675	3254	October	8.60
March	4975	4291	November	6700	3091	November	7.93
April	4629	4025	December	7166	3190	December	8.55
Total	55,910	42,108	Total	79,750	40,886	Total	100.00

<sup>1</sup> Includes both narcotic and nonnarcotic new prescriptions in all four stores, plus refills in Stores C and D.

#### SEASONAL DEMAND FOR NARCOTIC AND LIQUOR PRESCRIPTIONS

The volume of narcotic prescriptions in three professional stores is shown by months in Table X. The greatest demand for narcotic prescriptions in these stores was in January and February, followed by the months of March, April and December. There was much less demand for narcotic prescriptions in the summer and late spring months than in the winter.

Taking Store A individually, it was found that January produced an outstanding volume of narcotic prescriptions, more than twice as many as in July and August. January was also the outstanding month for this type of prescription in the case of Store B, nearly three times as many narcotic prescriptions being filled in January as in some of the summer months. But in the case of Store C, although January had a large volume of narcotic prescriptions, the leading months were December and February, followed closely by April and November.

In the prescription department report dealing with commercial type stores, narcotic prescriptions were tabulated by months for eight stores. In these commercial type drug stores, the largest volume of narcotic prescriptions was in the months December through April, over 14 per cent of the narcotic prescriptions filled during the year being filled in February, and 13.5 per cent in January.

The greatest demand for liquor prescriptions in four professional pharmacies taken together was in December, 13.44 per cent of the total number of liquor prescriptions filled in a year being filled in this month. December was clearly the outstanding month for this type of prescription for Stores A, C and D. However, Store B reversed this showing, filling the smallest number of liquor prescriptions in December.

For eight commercial type drug stores, the first prescription department report showed that 13.47 per cent of the liquor prescriptions were filled in December, almost exactly the same proportion as for the professional stores. For the commercial type stores, May and November were the next most outstanding months in this regard, although the sales volume in those months was not as outstanding as in October and November for the professional pharmacies, which months had the largest volume in the professional stores, December excepted.

TABLE X—SEASONAL VOLUME OF NARCOTIC AND LIQUOR PRESCRIPTION BUSINESS IN PROFESSIONAL PHARMACIES

Month	Narcotic Prescriptions of 3 Stores		Liquor Prescriptions of 4 Stores	
	Number of Prescriptions	Per Cent of Total	Number of Prescriptions	Per Cent of Total
January	2282	11 20	1718	7 12
February	2139	10 50	1652	6 86
March	1935	9 50	2022	8 39
April	2002	9 83	1882	7 80
May	1520	7 46	1901	7 88
June	1397	6 86	1689	7 00
July	1316	6 46	1747	7 24
August	1198	5 88	1729	7 17
September	1314	6 45	1869	7 75
October	1672	8 21	2344	9 72
November	1724	8 46	2323	9 63
December	1873	9 19	3242	13 44
Total	20 372	100 00	24 119	100 00

(To be continued next month)

TENTATIVE PROGRAM, CONFERENCE  
OF PHARMACEUTICAL ASSOCIATION  
SECRETARIES

Officers *President*, J Lester Hayman, 325 Ash St, Morgantown, W Va, *First Vice-President* Gustav Bachman, Minneapolis, Minn, *Second Vice President*, R C Wilson Athens, Ga, *Secretary Treasurer*, Carl G A Harring 20 Glen Road, Newton Center, Mass, *Delegate to the House of Delegates* Charles J Clayton, Denver, Col *Executive Committee* Robert A Lehman, Brooklyn N Y P J Garvin, New Haven, Conn, J W Slocum, Indianapolis, Ia, James J Gill Providence, R I

All sessions will be held in Hotel Lorraine  
First Session, Wednesday August 30, 2 00 P M, Colonial Room Second Session, Friday, September 1, 2 00 P M, Pompeian Room

The Conference of Pharmaceutical Association Secretaries will try the plan of having no papers read but, instead devote the sessions to round table discussions of timely topics A list of topics follows which may be added to

1 Should the president be the directing head of the Association or should the Executive Committee be the governing body?

2 What form of program is most acceptable at conventions?

3 The resolutions that are submitted at annual meetings—who writes them? Should the secretary take an active part in preparing same?

4 Is it desirable to divide states into zones for the purpose of giving each zone representation in the presidency by rotation?

5 Should the functions of a secretary include that of contacting allied trades for the purpose of federation?

6 Is it possible to devise some plan whereby neighboring states may avoid holding conventions at the same time?

7 Contests and novel schemes for increasing interest in annual meetings

8a In what states are local and district meetings habitually held and what is the character of the programs at such meetings?

b Are you following some concerted plan to link up these meetings with your State association for the purpose of increasing your membership?

9 What part do the drug trade salesmen play in the operation of State Pharmaceutical Associations and how can they function most satisfactorily—as associate members, or as independent affiliated organizations?

10 In what states are full time secretaries employed? What are they paid? How are the necessary finances obtained? What do such full-time secretaries do to justify the compensation received? What states have abandoned full secretary plan and why?

11 What constructive thoughts have you received from these conferences and what have you done to develop some of them for the benefit of your State association?



# EDITORIAL NOTES

Editor E G Eberle, 10 West Chase Street, Baltimore, Md

Members of the Council, A PH A S L HILTON, *Chairman*, CHARLES H LAWALL, *Vice Chairman*, E F KELLY, *Secretary*, H V ARNY, A G DU MEZ, H A B DUNNING WILLIAM B DAY, C E CASPARI J H BEAL, T J BRADLEY, AMBROSE HUNSBERGER *Ex Officio Members* W BRUCE PHILIP *President*, ROWLAND JONES, G H GROMMET *Vice Presidents*, C W HOLTON *Treasurer*, E G EBERLE *Editor of the Journal*, A G DU MEZ, *Editor of the Year Book*, J W SLOCUM *Chairman of the House of Delegates*

Collaborators The Members of the Council, E FULLERTON COOK, *Chairman*, U S P Revision Committee, E N GATHERCOAL, *Chairman* N F Revision Committee, Chairmen of the Sections A PH A W J HUSA, W J RIVARD, W PAUL BRIGGS LEON MONELL, LOUIS GERSH ENFELD, CHARLES H STOCKING *President*, A A C P, CHARLES B JORDAN, *Chairman* Executive Committee A A C P, CLARE F ALLAN, *President*, N A B P, HENRY C CHRISTENSEN *Secretary*, N A B P Scientific Section—Board of Review on Papers *Chairman* L W ROWE Detroit Mich JOHN C KRANTZ JR, Baltimore, Md, F J BACON, Cleveland, Ohio

On account of lengthy reports other matter had to be omitted from this issue of the JOURNAL

## THE LEADBEATER PHARMACY TO BE SOLD

The Leadbeater Pharmacy in Alexandria Va was sold at auction July 19th It



*His friend*  
*John H. Stabler*

dates back to the time of Washington who was a patron here Richard H Stabler, a former owner, died November 18 1878 aged

694

58 years He was born and educated at Alexandria Va, learned the drug business with his father and afterward studied medicine at the University of Pennsylvania He engaged in the drug business in Alexandria, and was elected professor of Pharmacy in the School of Pharmacy of the National Medical College, and afterward of the National College of Pharmacy at Washington He became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1856 and was elected *President* for the year 1870-1871

The apparatus records letters shelf bottles etc were purchased for the AMERICAN PHARMACEUTICAL ASSOCIATION

## THE BRITISH PHARMACY AND POISONS ACT

A list of substances to be treated as poisons under the Poisons Act is to be prepared An advisory committee to be known as the Poisons Board is to be formed for revising the schedule of poisons Of the five persons to be appointed by the Pharmaceutical Society the following have been named Secretary H N Linstead of the Society Secretary Mallison of the Pharmaceutical Union and E T Neathercoat, the other two will be from the manufacturing interests and company pharmacy "

## A LIFE OF SERVICE

Dr Frederick H Baetjer Baltimore, who died July 17th gave his life in the service of science and humanity He began his studies in the early days of X ray experimentation, before the danger of its burns was fully understood, and continued his work after the result

ing affliction necessitated his undergoing many surgical operations

## PERSONAL AND NEWS ITEMS

O A Farwell of Detroit was honored with the degree of Doctor of Science by the Detroit City College June 9th

Bernard A Bialk, secretary Detroit Branch, A PH A was awarded the Honorary Degree of Bachelor of Science in Pharmacy from the Detroit Technical Institute

Dr George H Meeker, dean of the Graduate School of Medicine, University of Pennsylvania, since he established it in 1918 was honored at a dinner, June 1st A portrait of Dr Meeker was presented to the university by Dr George Morris Piersol on behalf of those in charge of medical affairs

Dr A. Richard Bliss, Jr, has presented his resignation, effective August 15 1933, as Chief of the Division of Pharmacology in the University of Tennessee to accept the position of Director of the Research Laboratories of the William A Webster Company of Memphis

Dean A G DuMez, of the School of Pharmacy of the University of Maryland admits that it is possible to surprise him The occasion was a surprise party tendered Dr and Mrs DuMez on their twenty first wedding anniversary, June 9, 1933, by the Staff of the School of Pharmacy A small chest of silver coin was presented to Dr and Mrs DuMez with the request that they purchase a tray to complete their silver service

Those who attended the Toronto meeting of the A PH A will remember meeting Dr V E Henderson, professor of pharmacy and pharmacology at the University of Toronto He has been elected an honorary member of the Kaiserliche Leopold Carolinische Deutsche Akademie der Naturforcher, the oldest scientific society in Germany founded in 1652 Another honor that has come to Professor Henderson recently has been his reelection as secretary of the American Society for Pharmacology and Experimental Therapeutics

K K. Chen, G H A Clowes and Charles L Rose, Indianapolis have determined that Amyl Nitrate is a better antidote than Methylen Blue for Cyanide poisoning

Former President of the AMERICAN PHARMACEUTICAL ASSOCIATION, C Herbert Packard, has been seriously ill for a month or more, but is now recovering, following an attack of influenza and pneumonia

Samuel C Henry was elected *president* and Julius Riemenschneider *vice president* of the Chicago Veteran Druggists Association on Jameson Day Wilhelm Bodemann delighted the members by his presence, he has lately, been in poor health

We are advised that Deans W F Rudd and W B Day are recovering rapidly after several weeks of hospital experience

Anton von Hermann, aged 50 years, son of our fellow member E von Hermann, died June 12th, the latter is *corresponding secretary* of the Chicago Veteran Druggists' Association Sympathy is expressed

Dean R A Lyman was taken suddenly ill June 11th, and removed to Bryan Hospital, we learn that he is rapidly recovering

Leon Monell, *chairman* of the Committee on Pharmaceutical Economics, presented a comprehensive report before New York Pharmaceutical Association based on questionnaires of the year on the pharmaceutical activities in more than 500 drug stores The report has been reprinted

## MRS CATHERINE DIEHL

Mrs Catherine Diehl died at her home in Louisville after a lingering illness, aged 85 years Mrs Diehl was the widow of Prof C Lewis Diehl, president of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1874-1875, and the first Reporter on the Progress of Pharmacy elected by the ASSOCIATION in 1873 Mrs Diehl is survived by three daughters Mrs Emily Frank Miss Eleanor Diehl and Miss Jennie Diehl, several grandchildren and two brothers

Professor Diehl died March 25, 1917, aged 77 years this brings to mind the tributes expressed at the time of his death, for which see JOURNAL A PH A for April 1917, and other numbers of the same year See also a sketch in volume for 1916, page 119 For thirty eight years he was Reporter on the Progress of Pharmacy, for twenty eight years identified with the work on the National Formulary and for twenty seven years with revisions of the U S Pharmacopœia

American pharmacists will always remember him, and these few words, prompted by the passing of his helpmeet, are to remind us of her husband's great service to pharmacy When the revisions of the U S Pharmacopœia and National Formulary are completed, the teachers of pharmacy may be prompted to speak of him to their students

## SOCIETIES AND COLLEGES

Local Secretary Emerson D Stanley has supplied us with Madison photographs, some of which have been used in this number Prof Ralph W Clark of the University of Wisconsin, will supply you with highway maps for the asking

Secretary Christensen reports that registration at the World's Fair is good—the highest record for one day is 170 pharmacists and 43 physicians

By applying to the Visitor's Tourist Service Suite 1314-1321, Transportation Building, 608 So Dearborn St Chicago, you can have information relative to rates, routes, meeting place for friends parking etc

See your R R Agent for special rates to Chicago and Madison—Do not delay making inquiry

## MADISON HOTELS

Write the hotels or Secretary Emerson D Stanley, 602 First Central Building, for reservations in Madison The hotels are Loraine Park Belmont, Madison Capital, Fess, Cardinal, the Loraine is the headquarters hotel

## SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

See June JOURNAL for partial program of the Scientific Section and of the Section on Historical Pharmacy For officers of the Sections see page X of the Roster in this issue of the JOURNAL—*Write the officers and submit the titles of your papers*

## TENTATIVE PROGRAMS

SECTION ON EDUCATION AND LEGISLATION  
PRELIMINARY LIST OF TITLES FOR MADISON MEETING

Officers *Chairman* W H Rivard, Providence R I, *Vice-Chairman*, P H Costello, Cooperstown N Dakota, *Secretary*, C W Ballard, Mt Vernon, N Y *Delegate to House of Delegates*, R H Raabe, Ada Ohio

"The Development and Preparation of the New Pharmaceutical Syllabus," J G Beard  
"What Constitutes Good Teaching?" A B Lemon

"An Opportunity and a Challenge to Pharmacy Educators," H J Goeckel  
Pharmacy and Hospitals," Fred B Kilmer

"Public Health and Hospital Pharmacies," M Dauer

"The Pharmacy Board as the Sole Regulatory Body for Pharmacy" R P Fischels

## SECTION ON PRACTICAL PHARMACY AND DISPENSING

Officers *Chairman*, W Paul Briggs, 2121 H St, N W, Washington, D C, *Vice Chairman* M J Andrews, Baltimore, Md, *Secretary*, R E Terry, School of Pharmacy, University of Illinois, 701 S Wood St, Chicago, Ill, *Delegate to the House of Delegates*, I A Becker, Chicago, Ill

"Variations in Hand-Moulded Hypodermic Tablets" by S W Bower

"The Accuracy of Medicine Droppers with Flared Tips" and "The Protection of Prescription Labels with Lacquer," by Wm J Husa and Lydia M Husa

"A Preliminary Study of Capsule Tolerances," by Wm F Reindollar

"Aromatic Elixir" by L D Havenhill and M G Smolt

"The Prescription, the Physician and the Public," by L W Rising

"The Relationships of Prescription Incompatibilities to Pharmacy," by Leon W Richards

"A New Method for Debitting Cascara Sagrada Extracts," by August J Pacini

"Useful Dental Prescriptions," by A O Mickelsen

Determination of the Reasonable or Permissible Margin of Error in Dispensing II Ointments," by Marvin J Andrews

Hydrogen Ion Concentration of Certain Galenical Preparations" by C Jelleff Carr and John C Krantz, Jr

Dr George D Beal and Chester R Szalowski have submitted a list for four titles to be credited to this Section but to be presented at the Joint Session These are as follows

"Notes on the Water of Crystallization of Quinine Sulphate"

"An Iodometric Assay for Organic Nitrites"

"A New Identity Test for Phenolbarbital"

"A Test for Gelatin in Agar"

## SECTION ON HISTORICAL PHARMACY

Officers *Chairman* Louis Gershenfeld, Philadelphia, Pa, *Secretary* C O Lee Purdue University, Lafayette, Ind, *Delegate to the*

*House of Delegates*, L E Warren, Bureau of Chemistry, Washington, D C, *Historian*, E G Eberle, 10 W Chase St, Baltimore, Md  
*'Henrik Ibsen—Pharmacist'* by Lt Commander L H Roddis

*Superstition Credulity and Skepticism Three Bugbears with Which Pharmacy Has Always Had to Contend*, by Charles Whitebread

*C Lewis Ditch*, by John E Kramer  
*Dr John Tennent and Seneca Rattlesnake Root* by Ralph Bienfang

*Binding Up a Wound*, by Fred B Kilmer  
*'History of the Maryland Pharmaceutical Association'*, by E F Kelly

*'Fragment of Early Drug History in Ohio, the Shakers of Lebanon'* by John Uri Lloyd

*Development of the Mortar and Pestle* by John Thomas Lloyd

*'Gifts of the Gods to Primitive Man'* by John Thomas Lloyd

*'The Early Days of Pharmacy in the West'*, by John T Moore

*'Dover's Powder'* Marie Lembeck and Edward Kremers

*'The First Pharmacopœia'* by Edward Kremers

*'The Names by Which Paracelsus Has Been Known'* by Edward Kremers

*'Paracelsus in Literature'* by Edward Kremers

*The Apothecary in Literature A Contemporary of Lucca Landucci* by Edward Kremers

*Rewriting the History of Percolation*, by M Wruble and Edward Kremers

*'History of the Iowa Pharmaceutical Association'* by J M Lindly

*'Early Pharmacy and Pharmacists of Montana'*, by Charles E Mollett

*The History of Pharmacy in Kansas*, by M Noll

*Historical Pharmacy in Minnesota* by Frederick J Wulling

*'American Pharmacognosists of the Nineteenth Century'*, by Heber W Youngken

*'Historical Pharmacy'*, by Louis Gershenfeld

#### PLANT SCIENCE SEMINAR

*Officers* *Chairman*, W B Day, 701 S Wood St, Chicago, Ill, *Vice-Chairman*, Frank H Eby Temple University Philadelphia Pa, *Secretary Treasurer*, O P M Canis, Ozone Park, L I, N Y

The Plant Science Seminar will be held in

Madison, Wisconsin, August 21st to August 25th, with headquarters at the Chi Omega Sorority house at 115 Langdon St

Monday, August 21st, 9 00 A M

Registration and Business Session  
 Planning and Developing a Medicinal Plant Garden, Dr B V Christensen

History and Development of the University of Wisconsin Medicinal Plant Garden, Dr W O Richtmann

1 00 P M Trip to the Pharmaceutical Garden

8 00 P M Colored Photographs of Medicinal Plants, Dr M C Dicmer

Tuesday, August 22nd, 9 00 A M

Round Table Discussion on Poisonous Plants, Dr L K Darbaker

1 00 P M Trip to the Forest Products Laboratory

Wednesday, August 23rd, 9 00 A M

Session to Be Held at the Pharmacognosy Laboratory of the School of Pharmacy

*Pharmacographia Americana*, Dr W O Richtmann

*'Phytochemistry of Digger Pine'*, Dr A H Uhl

1 00 P M Boat Trip on Lake Mendota

8 00 P M Dr Karl Link

Thursday, August 24th, 9 00 A M

All Day Field Collecting Trip, Blue Mounds, and the Valley of the Wisconsin River Lunch at Spring Green

8 00 P M Film Topics, Dr L K Darbaker

Friday, August 25th, 9 00 A M

Genus *Mentha* Symposium  
 Display of Native and Cultivated Mints Grown at the Pharmaceutical Garden

The Chemistry of the Mint Oils, Dr Edward Kremers

Our Native *Menthass* Dr F J Bacon

1 00 P M Collecting Trip around the Madison Lakes and Pine Bluff

5 00 P M Picnic Supper at the Home of Dr Edward Kremers

8 00 P M Campfire Talk

#### NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH

*Officers* *Chairman*, E N Gathercoal, Chicago, *Vice Chairman*, William J Husa,

Gainesville, Fla , *Secretary*, John C Krantz, Jr , Baltimore, Fitzgerald Dunning, Baltimore *Place of Meeting*, Madison Wis *Time* 1933

First Session, 2 00 P M —Saturday, August 26th, Hotel Lorraine

- 1 Call to Order by Chairman
- 2 Appointment of Nominating Committee
- 3 Summary of Year s Activities and Outlook of Conference for the Future, by Chairman Gathercoal

- 4 Reports of Officers
  - a Report of Secretary
  - b Report of Treasurer
  - c Report of Executive Committee by Secretary

- 5 Reports of Standing Committees
  - (1) Pharmaceutical Dispensing, W J Husa Chairman
  - (2) Manufacturing Pharmacy E F Cook Chairman
  - (3) Medicinal Chemicals, George D Beal Chairman
  - (4) Pharmacognosy H W Youngken Chairman

- 6 Roll Call of Delegates
- 7 Report of Special Committee on Fellowship Award E N Gathercoal Chairman

- a The announcement of the second award of the Fellowship of the National Conference on Pharmaceutical Research

8 Adjournment for dinner Arrangements will be made for an assembled dinner for the delegates

An address pertinent to the work of the Conference will be delivered

#### Evening Session, 8 00 P M

- 9 (5) Pharmacology and Bioassays J C Munch, *Chairman*
- (6) Bacteriology and Biologicals A R Bliss *Chairman*
- (7) Physical Chemistry C B Jordan *Chairman*
- (8) Educational Methods A B Lemon *Chairman*
- (9) Pharmaceutical Economics Ambrose Hunsberger *Chairman*
- (10) Historical Pharmacy, C H LaWall, *Chairman*

- 10 Reports of other Special Committees
  - (1) Book on Research Achievements John C Krantz Jr

- (2) Census of Research J C Munch *Chairman*

- 11 General Discussion of the Status of Pharmaceutical Research

- 12 Election and Installation of Officers

- 13 Adjournment

JOHN C KRANTZ JR , *Secretary*

#### OFFICERS OF STATE PHARMACEUTICAL ASSOCIATIONS

*References to some state associations will be supplemented in next issue*

##### ALABAMA

Alabama Pharmaceutical Association elected the following officers at its meeting in Mobile *President*, Fred Martin, Birmingham, *First Vice President*, C C Thomas Selma *Second Vice-President*, N G Hubbard Birmingham, *Secretary*, W E Bingham, Tuscaloosa, *Treasurer* Hal E Duncan Birmingham, *Executive Committee*, Dora Megginson, E M Megginson and Samuel J Watkins

On recommendation of President Hayne the Executive Committee was increased from three to five members and the state is to be grouped according to Congressional Districts

##### COLORADO

The annual meeting of the Colorado Pharmaceutical Association was held in Colorado Springs June 13th to 15th The new officers are as follows *President* Sebastian Kletzky, Pueblo *First Vice President* Wm C Alexander, Salida, *Second Vice-President*, Paul G Stodghill Denver *Treasurer* Julius F Earnest Denver, *Secretary* Charles J Clayton Denver

##### CONNECTICUT

Connecticut Pharmaceutical Association elected the following officers for the ensuing year *President* Edward J Murphy, Manchester, *First Vice President*, Wm J Coughlan West Haven, *Second Vice President* Wm J Cody, Bridgeport, *Third Vice President* Joseph A Murphy Middletown, *Secretary* *Treasurer* P J Garvin New Haven

##### DELAWARE

Delaware Pharmaceutical Association held its annual meeting at same time and place with Maryland Pharmaceutical Association, at

Ocean City The following officers were elected *President*, Arthur H Morris, Lewes, *First Vice President*, Albert Binnam Wilmington, *Second Vice President*, Harry P Jones, Smyrna, *Third Vice President*, Edward J Elliott Bridgeville *Secretary*, Albert Dougherty Wilmington *Treasurer* Peter T Bienkowski Wilmington

## FLORIDA

Florida Pharmaceutical Association held its annual session at Tampa Among the speakers of the Convention were P A Foote and B V Christensen

The following officers were elected for the ensuing year *President* J K Cleimner Miami, *First Vice-President* Don Evans Orlando *Second Vice President* A C Hankins Orlando *Third Vice President* Victor Wray Haines City

## ILLINOIS

The 54th annual meeting of the Illinois Pharmaceutical Association was held in Galesburg *Secretary* H C Christensen of the National Association Boards of Pharmacy represented the A Ph A and spoke on the pharmacy exhibit at the Century of Progress

The officers elected for the ensuing year are as follows *President* Arthur Van Hooser Metropolis *First Vice President* George V Haering, Chicago, *Second Vice President* H M Anderson Monmouth *Third Vice-President* L Brown Hamilton, Galesburg, *Secretary* W B Day Chicago *Treasurer*, George M Bennett Urbana

## INDIANA PHARMACEUTICAL ASSOCIATION

Indiana Pharmaceutical Association elected the following officers *President* Asa E Smith Logansport, *First Vice President* Harry G May, Princeton, *Second Vice-President*, Ira V Rothrock Mt Vernon *Third Vice President* G T Revington, Monticello *Secretary* F V McCullough, New Albany *Treasurer* Harry J Borst, Indianapolis

Among the principal speakers of the meeting were Kiefer Mayer on "The Drug Institute" and Dr J H Weinstein, president of the Indiana State Medical Association discussed a report of the Committee on Costs of Medical Care He was supported by Dean C B Jordan

## KENTUCKY

The 56th annual Convention of the Kentucky Pharmaceutical Association was held at Crab Orchard Springs, June 20th-23rd, and had the largest registered attendance in the history of the Association The Association adopted a complete set of new by laws

The Kentucky Board of Pharmacy reported that it was carrying an injunction suit to the Court of Appeals asking for a decision or a ruling of the court as to whether or not general merchants may sell *all kinds* of patented or proprietary items The contention of the Board being that poisons or strictly pharmaceutical items whether patented or not, can be sold only by registered pharmacists This case is now before the Kentucky Court of Appeals

The following officers were elected for the coming year *President* George D Duncan Franklin *Secretary* J W Gayle, Frankfort, *Treasurer* William J Johnston, Mayfield, *Chairman of Executive Committee* William H Fischer, Louisville

## MARYLAND

Maryland Pharmaceutical Association at its meeting in Ocean City elected the following officers *Honorary President* Dr D M R Culbreth, *President* L V Johnson, St Michaels, *First Vice President*, A F Ludwig, Baltimore, *Second Vice-President* H W Matheney, Cumberland, *Third Vice President* M Strasburger, Baltimore, *Secretary*, E F Kelly 10 W Chase St, Baltimore, *Treasurer* Harry S Harrison, Baltimore, *Editor*, R L Swan Baltimore

## MASSACHUSETTS

Massachusetts State Pharmaceutical Association held its 52nd annual meeting at the New Ocean House, Swampscott, June 12th to 14th Resolutions were adopted endorsing the Copeland Bill against counterfeiting drugs More attention is to be given to the establishment of local associations and providing for their cooperation

Appropriations were made for the attendance of the secretary at the Secretary's Conference in Madison The following officers were elected for the ensuing year *President* Martin E Adamo Boston, *First Vice President*, Joseph A Martin Malden *Second Vice President* T Joseph McAuliffe Lynn, *Treasurer*, Lyman W Griffin, Boston, *Secretary* Carl G A Harrington Newton

## MICHIGAN

Michigan Pharmaceutical Association elected the following officers for the ensuing year *President*, Duncan Weaver, Fennville, *First Vice President* Paul Gibson, Ann Arbor, *Second Vice-President*, J E Mahar, Pontiac, *Treasurer* Wm H Johnson, Kalamazoo, *Secretary*, R A Turrel, Crosswell

## MISSISSIPPI

The Mississippi Pharmaceutical Association met in Jackson June 19th to 21st The following officers were elected *President*, G C Roberts Greenwood, *First Vice-President*, Lew Wallace, Laurel, *Thrd Vice President* J S Puller, Starkville, *Secretary Treasurer*, S B Key, Jackson

It was decided to hold the 1934 meeting in Jackson

## NEBRASKA

Nebraska Pharmaceutical Association held its sessions at Lincoln June 5th to 7th Approval was given to the Drug Institute The following officers were elected for the ensuing year *President* Fred J Creutz, Wausa *First Vice President* Guy Butler Lincoln *Second Vice-President* Frank Cline, Auburn, *Thrd Vice President*, R W Dunkle, Shelby, *Fourth Vice President* H L Bellamy Cambridge, *Fifth Vice President* Fred V Bors, Wilber, *Treasurer*, Orel Jones Oconto, *Secretary* J G McBride Lincoln

## NEW JERSEY

The 63rd annual convention of New Jersey Pharmaceutical Association was held at Asbury Park, June 14th to 16th Resolutions stressed the importance of U S P and N F propaganda Resolutions were adopted providing for a change in the pharmacy law to permit the Board of Pharmacy to examine graduates of approved colleges of pharmacy to qualify for theoretical examinations immediately after graduation and that the Board be given authority to regulate the type of practical experience to be required

Another resolution provides that those named for the State Board of Pharmacy be qualified by education for the degree of Graduate in Pharmacy

President Henry D Kehr made a number of important recommendations which were adopted and which include organization of a

Council of county delegates, appointment of an Emergency Relief Administration committee, prizes were provided for Pharmacy Week and also for students at the New Jersey College of Pharmacy

The following officers were elected *President*, Walter R Woolley, Asbury Park, *First Vice-President*, Wm H Tegeler, Audubon, *Second Vice-President* Wm R Richart, Elizabeth, *Secretary*, Prescott R Loveland, Atlantic City, *Treasurer*, Charles J McCloskey, Culver Lake

## NEW MEXICO PHARMACEUTICAL ASSOCIATION

The fifth annual convention of the New Mexico Pharmaceutical Association was held at Carlsbad Taos was selected as the meeting place for 1934 and the following officers were elected *President*, Roy E Campbell, Fort Sumner, *First Vice-President*, S J Mollands, Taos, *Second Vice President*, L A Rice Albuquerque, *Secretary Treasurer*, H E Henry, Albuquerque

## NEW YORK PHARMACEUTICAL ASSOCIATION

New York Pharmaceutical Association held its annual meeting at Stamford, June 20th-23rd A total new membership of 1064 was enrolled due largely to the efforts of Secretary Robert S Lehman

President Miller reviewed the work of the Association and many valuable papers and reports were received Many important resolutions were adopted, among them one to support the Drug Institute when its code of procedure is known and endorsed by the Committee on Ethics

The following officers were elected *President* John F O'Brien, Rochester, *Vice Presidents*, John Scavo, New York City, Henry J Wildhack Newark N Y, Morris Brodken, New York City, *Secretary*, Edward S Dawson Syracuse, *Treasurer* Richard A Austin Cairo, *Members of the Executive Committee* Fred C Schaefer, Brooklyn, Curt P Wimmer, New York City, Albert A Muensch, Syracuse

## NORTH CAROLINA

North Carolina Pharmaceutical Association held its sessions in Charlotte, June 20th-22nd and the attendance was larger than that of any preceding meeting The Drug Institute re

ceived consideration Dues for proprietors were reduced to \$10 00 and those of non proprietors to \$4 00 It was decided to cancel unpaid balances of delinquent members, provided such members paid their dues for the current year Wrightsville Beach was selected for next year's convention and J M Hall was elected *Local Secretary*

The following were installed as officers for 1933-1934 *President* J C Hood, Kinston *First Vice President*, R A McDuffie, Greensboro, *Second Vice President*, E F Rimmer, Charlotte, *Third Vice President* P B Bisette Wilson, *Secretary*, *Treasurer* J G Beard, Chapel Hill, *Member of the Executive Committee* for 3 year term I W Rose, Chapel Hill

#### NORTH DAKOTA

Dickinson was selected for the next place of meeting and the following officers were elected for the ensuing year *President*, William Eckstrom, Stanley, *First Vice-President* L G Beardsley, New Rockford, *Second Vice President*, C H Saunders, Minot, *Secretary* W F Sudro, State College Station, Fargo, *Treasurer*, P H Costello, Cooperstown, *Local Secretary* Philip H Boise, Dickinson Place of Meeting Dickinson

#### PENNSYLVANIA

The Pennsylvania Pharmaceutical Association held its annual meeting at Bedford Springs Hotel Bedford Springs, June 27th to 29th The officers elected are as follows *President* Robert R Gaw, Pittsburgh, *First Vice-President*, Frank P Kelly, Carbondale, *Second Vice President* George W Grier, Pittsburgh, *Secretary*, *Treasurer*, J B Pilchard, Harrisburg, *Executive Committee, Chairman* C Leonard O'Connell, Pittsburgh, Henry Brown, Scranton, John C Walton, Philadelphia

The 1934 meeting will be at Wernersville

#### SOUTH CAROLINA

The South Carolina Pharmaceutical Association held its annual meeting June 14th and 15th, at Greenville Officers were elected as follows *President* L E Bishop, Laurens, *First Vice President*, V F Platt, Conway, *Second Vice President*, George T Kellers, Union, *Third Vice President*, L A Melchers, Charleston, *Secretary and Treasurer* J M Plaxco, Due West

Charleston was chosen as the meeting place for 1934

#### SOUTH DAKOTA

South Dakota Pharmaceutical Association elected the following officers for the ensuing year *President*, Bliss Wilson, Letcher, *Vice-President* George Lloyd, Spencer, *Vice President as Chairman on Scientific and Practical Pharmacy*, L A Daniels, Aberdeen, *Vice President as Chairman of Section on Education and Legislation*, N B Porter, Madison, *Secretary*, Roland Jones, Gettysburg, *Treasurer*, Frank S Bockoven, Clark

#### VIRGINIA

The officers of the Virginia Pharmaceutical Association elected for the years 1933-1934 are as follows *President*, James M Lea, Schoolfield, *Vice Presidents*, Edw P Berlin, Berryville, Guy L Miller, Charlottesville, Robt G Barr, Virginia Beach, Roy Crouch, Roanoke, H S Faleoner, Newport News, W G Crockett, Richmond, *Secretary*, *Treasurer*, A L I Winne, Richmond

Hot Springs was selected for the next place of meeting, July 9th-11th

#### WISCONSIN

Among the speakers at the 53rd annual convention at Green Lake were the following G A Bender on 'Ways to Build Up the Prescription Department,' H C Christensen on 'The Pharmacy Exhibit at the World's Fair,' Edward Kremers on 'Pharmacy and Its Status,' *President* Oscar Rennebohm outlined Association activities and recommended *The Wisconsin Druggist* be continued

The following officers were elected for the ensuing year *President*, Otto H Berndt, Manitowoc, *First Vice President* Edward J Ireland, Madison, *Second Vice-President*, Paul Janke, Milwaukee, *Third Vice President* Dick Millbauer, Clintonville, *Secretary*, Ralph W Clark, Madison, *Treasurer*, B F Leidel, Milwaukee

#### "MAXIMUM HOURS EXEMPTION" REQUIREMENT

*President* Roosevelt in his recent message exempted from the "maximum hours" requirement registered pharmacists and other professional persons employed in their profession, and those employed in a management or executive capacity for more than \$35 00 per week Other exemptions are made, but do not directly apply to pharmacy



### AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION

The American Pharmaceutical Manufacturers' Association held its meeting at the Edgewater Beach Hotel Chicago, June 21st. The officers elected for the ensuing year are as follows: *President* Carl L. Angst Indianapolis Ind., *Vice Presidents*, E. G. Paisley, Philadelphia, Pa., F. W. Misch, Lincoln Nebr., *Secretary* C. W. Warner Newark, N. J., *Treasurer* Frank A. Mallett, Des Moines, Iowa. *Members of the Board of Directors*, S. DeWitt Clough North Chicago, Ill., Elmer H. Hessler, New York City, John G. Searle Chicago, Charles Wesley Dunn, Esq., was re-elected Counsel.

Among the subjects of discussion were the new Food and Drugs Bill and resolutions approved the amendment which prohibits false or misleading advertisements. Dr. Paul Nicholas Leech, secretary of the Council on Pharmacy and Chemistry of the American Medical Association, was one of the principal speakers, his subject was "Pharmaceutical Products of the Future."

The constructive purposes of the Drug Institute were approved.

### FEDERAL WHOLESALE DRUGGISTS' ASSOCIATION

The meeting of the Federal Wholesale Druggists' Association was held June 27th-28th.

Resolutions were adopted that a code be filed on behalf of the Federal Wholesale Druggists' Association and its stockholders and customary members, etc., in view of the presentation of codes by so many other industries or sub-divisions thereof at the present time. The Committee on Code is constituted as follows: *Chairman*, J. P. Jelenek, Minneapolis, F. T. Roosa, Cleveland, S. C. James, Buffalo, A. E. James, Baltimore, R. E. Lee Williamson Baltimore, E. C. Brokmeyer Washington.

The following officers were elected at the recent meeting of the Proprietary Association: *President*, Frank A. Blair (reelected), *Honorary Vice-President*, Dr. V. Mott Pierce, *First Vice-President*, Robert L. Lund, *Second Vice-President*, E. K. Hyde, *Third Vice-President*, J. H. Horne, *Secretary-Treasurer*, Charles P. Tyrell, *Members of the Executive Committee* for three years, John F. Murray, Ellery Mann and William Y. Preyer.

### OFFICERS OF THE PROPRIETARY ASSOCIATION

Two pharmaceutical institutions for women, namely, the Showa Women's College of Pharmacy and the Women's Department of the Tokyo College of Pharmacy, have received official government recognition as to college standing on March 29th. About a year ago these colleges began preparations for such government recognition and the Education Department has favorably reported its findings.

### PHARMACEUTICAL COLLEGES FOR WOMEN IN JAPAN

Two pharmaceutical institutions for women, namely, the Showa Women's College of Pharmacy and the Women's Department of the Tokyo College of Pharmacy, have received official government recognition as to college standing on March 29th. About a year ago these colleges began preparations for such government recognition and the Education Department has favorably reported its findings.

## LEGAL AND LEGISLATIVE

### THE LEGAL RANGE OF THE BRITISH PHARMACOPŒIA

The *Chemist and Druggist* of June 3rd discusses the legal range of the British Pharmacopœia in part as follows:

'It is, of course, a fact that where there exist in commerce two standards for any article, that is to say (1) the standard with which the article must comply when required for medicinal use and (2) the standard with which the article must comply when required for a commercial purpose apart from medicinal use, a chemist—or any one else for that matter—is entitled to plead that unless the purchaser of the article makes it clear that he is buying the

article for medicinal purposes, his demand is satisfied by the supply of an article which conforms to the recognized commercial standard. But subject to this exception, we doubt, with all due respect to our learned contemporary, whether in practice there is any uncertainty as to the fact that when an article is required for medicinal use the courts will regard the supply of that which does not conform to the standard of the B. P. (when there is one) as an offense. Pharmacists moreover, must expect in virtue of their acknowledged position as suppliers of medicinal articles, that very slight evidence will raise a presumption that the article demanded is demanded for medicinal purposes, even where two standards exist. *Prima facie*, then, a

chemist who is asked for an article named in the Pharmacopœia by a name or synonym which appears in the Pharmacopœia ought to supply an article corresponding to the pharmacopœial standard, and harsh though it may seem, there appears to be no reason to suppose that it would be any defense to him to say "The article I supplied would have corresponded with the Pharmacopœia but for the fact that a new edition has been published which fixes an altered standard." Standards are altered—in theory at least—because in the opinion of the competent authority the altered standard is more desirable, and a pharmacist would surely be on poor ground in attempting to argue that the supply of an article corresponding to the presumably inferior standard of a former edition was an adequate compliance with the demand for an article named in the existing edition."

#### ONE RESULT OF ALTERED STANDARDS

It follows that in theory, an inspector under the Food and Drugs Acts might within a few days after the publication of a new Pharmacopœia demand from a chemist an article the standard for which had been altered in that edition and lay an information if he were supplied with an article which corresponded to the old but did not correspond to the new standard. Such an attempt would never be made, we assume by any inspector with a proper view of his duties nor should the local authorities sanction a prosecution in such circumstances. But, as chemists know to their cost not all local authorities administer the Food and Drugs Acts with equal intelligence. There are still to be found districts in which the

authority appears to value its inspectors in proportion to the number of convictions which can be secured by trapping blameless chemists and other traders into committing technical offenses. Probably this is a risk which can never be wholly eliminated."

#### CONNECTICUT RESTRICTS USE OF WORD PHARMACY OR SYNONYM

An Act concerning unauthorized use of the word "pharmacy" or synonym in Connecticut is quoted herewith:

"Be it enacted by the Senate and House of Representatives in General Assembly convened

Section 445a of the Cumulative Supplement of 1931 is amended to read as follows:

Any person, firm or corporation owning, managing or conducting any store, shop or place of business not being a licensed pharmacy, exhibiting within or upon the outside of such store, shop or place of business, or including in any advertisement in a newspaper, book, magazine, circular or other printed matter, the words 'drug store,' 'pharmacy,' 'apothecary,' 'drug,' 'drugs,' 'medicine shop' or any combination of such terms or any other words indicating that such store, shop or place of business is a place where medicines are compounded, or exhibiting within or without such store, shop or place of business or in connection therewith any show bottle or globe of colored glass or filled with colored liquid shall be fined not more than two hundred dollars or imprisoned not more than thirty days or both." H. B. 572 Public Health and Safety

### BOOK NOTICES AND REVIEWS

*The Medicinal and Poisonous Plants of Southern Africa*. By JOHN MITCHELL WATT, M.B., Ch.B., Professor of Pharmacology in the University of the Witwatersrand, Johannesburg and Maria Gerdina Breyer Brandwijk, Phil. doct. (Utrecht), Apotheker (Utrecht). Formerly Junior Lecturer in Pharmacology and presently Research Worker in Phytochemistry in the Department of Pharmacology in the University of Witwatersrand, Johannesburg. 1933, pages xx + 314, 12 color plates and 20 illustrations. Price \$8.25. Publishers: William Wood and Company, Baltimore, Maryland.

This book is an answer to the botanist's, pharmacognosist's and pharmacologist's prayer. A wealth of crude drugs have been coming from South Africa, and the number of these products has been increasing in recent years. The standard reference books have given only meager information, or none at all upon most of the new materials. In certain toxicological cases circumstantial evidence has suggested the use of some African poisonous plant but confirmation has been impossible because of the lack of authentic information.

The authors have arranged a system whereby specimens of medicines, charms or poisons are

obtained, together with their histories and uses. This represents an important step in collecting information on these widely scattered products. Some of the medicinal plants have been used in the preparation of secret remedies, without any clear information regarding the action of the product employed. It has been the aim of the authors to record all the available information on the medicinal uses, chemical composition, pharmacological effects and the human and veterinary toxicology of the flora of Southern Africa."

The contents are arranged in 128 botanical families, well illustrated by color plates and illustrations. Pertinent bibliographic references are given throughout the text and accompanied by 28 general references to African medicinal plants. An index of botanical names is followed by an index of English and African names and by an index of native names. This will be very useful in identifying products discussed in various reports. An index of active principles greatly facilitates reference to the contents of the volume.

A very extensive and complete survey of the medicinal and poisonous plants of Southern Africa is presented which should prove of great value in further studies in medicine, pharmacy, phytochemistry and toxicology. The authors have kindly offered to assist correspondents in tracing the identity of plants and it appears that much attention will be given to this proffered assistance. It is hoped that the information collected on African charms may be published to supplement the meager information we now have along this line.—JAMES C. MUNCH

#### PUBLICATIONS RECEIVED

##### PROCEEDINGS OF THE FIFTY EIGHTH ANNUAL MEETING OF THE NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION

Proceedings of the 58th annual meeting of the National Wholesale Druggists' Association held at Green Brier Hotel, White Sulphur Springs, W. Va., September 1932.—The

'Proceedings' follow the usual lines of reporting and contain much information that has value to all divisions of the drug-trade activities. The reports are of particular interest and among them those of the legislative and of the publicity committees. The "Principles of Business Conduct" as passed at the 12th annual meeting of the Chamber of Commerce of the United States are included

A valuable list is that of the publications issued by the Association, which includes bulletins which may be had from the National Wholesale Druggists' Association, 51 Maiden Lane, New York, N. Y. The mechanical part of the book is of the usual quality. A list of the officers is given and half-tones of the officers and Board of Control grace the pages.

*Whitla's Pharmacy, Materia Medica and Therapeutics*, twelfth edition, revised by J. A. GUNN, Professor of Pharmacology in the University of Oxford, assisted by H. BERRY, head of the Department of Pharmacy, Birmingham Central Technical College and J. CLIFFORD HOYLE, M.D., Medical Business Assistant and Administrator in Pharmacology, London Hospital, published by Wm. Wood & Co., Baltimore, price \$4.25. The appearance of this book in its twelfth edition speaks to that extent of its usefulness. *Materia Medica and Therapeutics* are outstanding subjects in this work of about 700 pages. Previous editions of the book have been reviewed in the JOURNAL.

The International Pharmaceutical Federation has published a Report of the International Committee on Specialties. The committee is composed of Drs. H. Thoms,<sup>1</sup> Berlin; A. Rising, Stockholm; H. Baggesgaard, Ramsen, Copenhagen; W. Herissey, Paris; J. Van Itabe, Leyden; Dr. E. Weis, Vienna, in cooperation with Dr. E. Host, Madsen, Copenhagen and Dr. E. Schulek, Budapest.

General assay methods are described and defined. This is a most valuable report on various methods and assay processes.

The Wellcome Research Institution and the Wellcome Foundation Ltd., have issued a handsomely prepared illustrated booklet of the exhibits at the Chicago Exposition. Represented in the exhibit are the Bureau of Scientific Research, the Entomological Field Laboratories, the Physiological Research Laboratories, the Chemical Research Laboratories, the Historical Medical Museum and the Museum of Medical Science.

The Wellcome Research Institution and the Affiliated Research Laboratories and Museums were founded by Sir Henry Wellcome. Aside from being a directory of the exhibit the booklet contains much useful information.

<sup>1</sup> Deceased.

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXII

AUGUST, 1933

No 8

EDWARD STABLER \*

THE stock which laid the foundation of Edward Stabler's pharmacy in Alexandria was invoiced at 96£ 2s and 3d. It was bought through the agency of Townsend Speakman, wholesale druggist of Philadelphia, June 25, 1792. The latter cautioned the buyer to reduce quantities ordered, "apprehending it most for thy interest for thee to have smaller quantities at first till thou hast had some experience." The venture was a success—the stock, purchased by note, was paid for and doubled by the end of the first year, and the young apothecary married Mary Pleasants.

The first stock included three-quart flint-glass bottles with glass stoppers, at 5 shillings each. Two of these bottles disappeared—one remains, which was billed as containing spirit of nitre and is part of the purchase for the AMERICAN PHARMACEUTICAL ASSOCIATION. An association in Alexandria contemplates establishing a museum in the store room and keeping it open for the public, if so, it is tentatively agreed that the articles purchased will remain in Alexandria so long as the museum is maintained. If not, the items will be moved to the Headquarters Building in Washington.

The clock dates back to the earlier years of the pharmacy. There are many records, books, orders, prescriptions, etc., which connect the history of the pharmacy with the present. A plate on the front counter records where Robert E. Lee received orders to proceed to Harpers Ferry to apprehend John Brown.

---

\* Edward Stabler's earlier pharmaceutical experience was gained in the drug store of his brother, William, at Leesburg, Va. The first of the Leadbeaters came to Alexandria in 1830 and engaged with William Stabler son of Edward, who had succeeded to the business. In 1835, John Leadbeater married a daughter of Edward Stabler and became a partner in the firm of William Stabler and Bro. in 1844, and sole owner in 1852.

# EDITORIAL

E G EBERLE, EDITOR

10 West Chase Street, BALTIMORE MD

## THE PHOENIX AS AN NRA EMBLEM

THE NRA emblem has been interpreted as being that of a phoenix or of an eagle, more commonly designated as the "Blue Eagle." Seemingly it represents a phoenix and this mythical bird, adopted by the alchemists as their emblem, was during later periods a sign frequently used by pharmacists. "Wootton's Chronicles of Pharmacy" states that "according to Herodotus the Egyptians worshipped this bird, it was about the size of an eagle, with purple and gold plumage and a purple crest, its eyes sparkled like stars." Arising from its ashes the phoenix was perpetuated, thus it is an insignia of purification which may be acceptable as an emblem of pharmacy.

The President may have had the thought in mind as a symbol of resurrection from the ashes of past follies, which is essential to the restoration of national prosperity. The follies of the past years have been responsible, to a large extent, for the conditions which disturb us and recovery must come about by correction of methods which seek unfair advantages prompted by selfishness and greed and, to some extent, undermined confidence in activities, the success of which is largely dependent on public confidence. No doubt individuals and groups knew that eventually the penalty for selfish acts would have to be paid, but they were hopeful that somehow or other payment would be long deferred and, in the meantime, there would be gradual improvement, but to an extent conditions were so disturbing that "surgery" or "rejuvenation" as ascribed to the phoenix were deemed necessary. It will require not only all the skill, strength and patriotism of the officials in charge, but of those engaged in the industries and of all citizens to make the recovery plan effective. Codes are essential, but also a determination to establish better conditions and uphold them, and to that end the public must take a greater interest in forcing compliance with honest practices. The public has been largely responsible for the conditions because of indifference, selfishness and greed. "This 'bird of promise' will benefit those who adopt the insignia in good faith. It will benefit most those who, looking, striving upward, leave farthest behind the taint of practices deservedly left in the past." As we view it, the quoted lines express thoughts, far-reaching in their meaning and interpretation.

---

## INTERPRETING THE CODES

AS previously stated, President Roosevelt exempted from "maximum hours" requirement *registered pharmacists* and other professional persons employed in their profession and those employed in a management or executive capacity for more than \$35.00 per week. In all probability, those who are engaged in pharmaceutical service other than as above will be included, but persons employed in the drug stores for work which does not link them with pharmaceutical engagements will have to be provided for under codes that limit the hours of work. It

is not intended to discuss this phase of the situation because codes have been under consideration and some temporarily in effect While all divisions of the drug industry are closely related to pharmacy the exemption provided for pharmacists is very important and relieves pharmacists of an embarrassing situation, which would have meant a heavy burden, this has been a matter of great concern and received the attention of the AMERICAN PHARMACEUTICAL ASSOCIATION

Naturally, disagreements have arisen on other questions which will not be commented on, the Department seems to be devoting its efforts to enforcement of the principle that no special interest shall make use of the National Industrial Recovery Act to gain an advantage over another In discussing the subject of "Definite Business Improvement" the *Oil, Paint and Drug Reporter* says "The Administration's move for economic improvement purposes one other achievement (in addition to the creation of a favorable mental attitude) It seeks to remove from business life the influences that have prevented the permanency of prosperity, or, at least, the maintenance of a higher average level of the common welfare It is this purpose alone that differentiates the recovery now in progress from that which marked the passing of previous depressions It is this purpose that seeks recovery that will stay, that will be mentally proof against the idea that slumps must come and then must run their supernaturally appointed course Business must see this greater purpose in the planning of economic progress It must lend its aid to the attainment of the purpose, seeking continued good rather than immediate benefits, better, yes, but fleeting "

A result for the good of the public should come out of this adjustment in restricting the sale and dispensing of medicines to those qualified by education and training Times like the present bring to the fore a realization of conditions which have not heretofore been disturbing factors and it is to be hoped that the public will gain a clearer appreciation of the fundamentally important rôle of pharmacy for its protection

---

#### THE MADISON MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

THE programs of various sections are being completed and promise a most interesting meeting Consult the June and July JOURNALS, and the number for August presents many additional papers Aside from the sections the Conferences of Pharmaceutical Law Enforcement Officials and of the Pharmaceutical Association Secretaries promise discussions of interest to every pharmacist The programs heretofore printed will acquaint the readers with topics that are subjects for important discussions The following titles are part of the program of Law Enforcement Officials and bespeak the interest of all who will attend the Madison meeting, all of them will be introduced by contributors well and favorably known to pharmacists In the list are

"A Legislative Attempt to Restrict the Opening of New Drug Stores," "The Value of Annual Renewal of Pharmacists' Certificates Is the Enforcement of Pharmacy Laws," "A Legislative Attempt to Establish Prescription Tolerance," "What Privileges Should Be Granted Unregistered Dealers under the Pharmacy

Law?" "The Need for Strict Enforcement of the Law," "Restricting the Practice of Pharmacy to Proper Persons," "The Importance of Synonyms in the Enforcement of Drug Standards and Their Relationship to the Enforcement of Pharmacy Laws," "The Proposed Amendments to the National Food and Drugs Act," "Narcotic Legislation in 1932-1933," "The Proper Enforcement of Fair Practice Codes for the Drug Industry under the National Industrial Recovery Act, General Enforcement Procedure and Technic"

Those who attend will have the opportunity of visiting the Chicago World's Fair. Attractive rates have been made to Chicago and return, and tickets on the Certificate Plan from Chicago to Madison and return may be purchased, permitting a stop-over.

"Wisconsin can probably lay claim to more varieties of scenery than any other state in the Union. Here are the gentle, rolling prairie lands, the rounded hills of the Kettle Moraine country in southeastern Wisconsin, the great lakes regions of the north which are sprinkled with lakes like the stars in the heavens, and criss crossed with streams which vary from lazily flowing rivers to rushing torrents and cataracts like the Flambeau, the Brule, the Chippewa and others, Bayfield and the Apostle Islands in Lake Superior, the wind-carved hills of the dune country, Lake Winnebago, the largest inland lake entirely within the borders of a single state, the unglaciated area of the southwest, also called the driftless area, the bluffs of the Mississippi, one of the rarest sights in the world, and compared by travelers with the Rhine and the Hudson, the Dells of the Wisconsin, and the Dalles of the St. Croix. It would have been well-nigh impossible to have crowded within the limits of 56,000 square miles more beauty and more varieties of magnificent scenery than rightfully belongs to Wisconsin."

Madison is a beautiful university city, located among four lakes, and the Local Committee has arranged many entertainments for the visitors. Make your arrangements for the meeting without further delay—you will have the benefits of the convention and an enjoyable outing and, in addition, the opportunity of seeing the great World's Fair.

---

#### MADISON HOTEL RATES FOR A PH A CONVENTION

Loraine (Headquarters) with bath single \$2 50-\$4 00, double, \$4 50-\$7 00 Without bath, single \$2 00-\$3 50

Park Hotel with bath single \$2 50-\$3 00 double \$4 00-\$6 00 Without bath single \$1 50-\$2 00, double, \$3 00-\$3 50

Belmont, with bath \$2 50-\$5 50 Without bath \$2 00-\$3 50

Madison, with bath \$2 00-\$2 50 Without bath \$1 00-\$2 00

Capitol with bath \$1 50-\$2 50 Without bath \$1 00-\$2 00

Cardinal, with bath \$1 75 Without bath \$1 00-\$1 25

Fess Hotel, \$1 25-\$2 00

The Sherman Hotel at Randolph and Clark has been selected as Chicago headquarters for members stopping over in Chicago. The following rates are quoted by the Sherman Hotel: Single \$3 00, double, \$5 00, double, twin beds \$6 00

# SCIENTIFIC SECTION

BOARD OF REVIEW ON PAPERS—*Chairman*, L. W. Rowe, John C. Krantz, Jr., F. J. Bacon

## THE RELATION OF SOME PHYSICAL PROPERTIES TO BACTERICIDAL ACTION OF SOME $\alpha$ -PHENYLSUBSTITUTED ACIDS

BY L. H. BALDINGER AND J. A. NIEUWLAND

Duggan (1) has shown that in the fatty acid series with increasing length of side chain there is a decrease in the antiseptic action. Using *Bacillus subtilis* as the test organism, he found that seven per cent formic acid, nine per cent acetic acid and twelve per cent propionic acid were required to restrain the growth of the organism. Siegler and Popenoe (2), (3) while investigating the action of fatty acids on green apple aphid found that the toxicity of the aliphatic acids increased with the molecular weight, reaching a practical toxicity at the  $C_6$  acid. Tattersfield (4), using a different organism, later reported an increasing toxicity in the fatty acid series up to undecylic acid. According to his work, some correlation was shown between certain physical properties and toxicity. Loeb (5), while investigating the action of acids on the eggs of the sea urchin, found that the permeability of the cell membrane varied with the chemical constitution of the acid, thereby accounting for the varying toxicity. He also reported that the undissociated molecule of the acid appeared to constitute the toxic agent against the organism used. Similar relationships as to the disinfectant action of undissociated molecules have been shown by Ishiwara (6), Halvorson and Cade (7) and Levine, Peterson and Buchanan (8).

Laws (9), using a series of phenylsubstituted acids, observed that the converse of Duggan's results held for this type of acid. He found that phenylacetic acid showed a bactericidal action more than twice as strong as phenol,  $\beta$ -phenylpropionic acid three times that of phenol and  $\gamma$ -phenylbutyric acid five times that of phenol. Daniels and Lyons (10) prepared a series of  $\omega$ -phenylsubstituted acids and determined certain physical constants of solutions of these acids, correlating these constants with the relative bactericidal action of the acids using *B. coli* and *B. typhosus* as test organisms. They found that the type of curve presented by the solubilities, the distribution coefficients, adsorption on activated charcoal, quite closely paralleled the curve presented by the bactericidal action. They found the surface tension lowered constantly with increase in molecular weight.

Having available a fairly convenient method for the preparation of a series of  $\alpha$ -phenylsubstituted acids, it was decided to determine the relative bactericidal power of each of the acids and to compare this with some physical properties of their solutions, namely, solubility, adsorption on animal charcoal, distribution coefficient between oil and water and surface tension. While benzoic acid cannot, strictly speaking, be considered a member of this series, it was included in the tests. In the preparation of the graphs throughout this work the following abbreviations have been used:

B = Benzoic acid  
A = Phenylacetic acid  
P =  $\alpha$ -Phenylpropionic acid  
Bu =  $\alpha$ -Phenylbutyric acid

V =  $\alpha$ -Phenylvaleric acid  
C =  $\alpha$ -Phenylcaproic acid  
H =  $\alpha$ -Phenylheptic acid



## EXPERIMENTAL

*Preparation of the Acids*—The nitriles of the acids, with the exception of benzoic and phenylacetic, were prepared by the sodium-liquid ammonia method (11) The nitriles were then hydrolyzed by a slightly modified procedure of Pickard and Yates (12), which gave much better results than the alkali hydrolysis as recommended by Bodroux and Taboury (13) The procedure was as follows

The nitrile was refluxed for eight or nine hours with moderately strong sulphuric acid (3 2) In order to prevent violent bumping of the mixture a glass tube drawn into a capillary was inserted through the stopper of the reaction flask so that the capillary dipped into the lower acid layer A fine stream of dry air was passed through the mixture during the refluxing The mixture was diluted with water and extracted with ether The organic acid was then removed from the ether by extraction with ten per cent potassium hydroxide solution This alkaline solution was then acidified with dilute sulphuric acid and extracted with ether to remove the organic acid After drying the combined ethereal extracts over calcium chloride, the ether was distilled over a water bath and the acid distilled under reduced pressure

All of the freshly distilled acids were clear, viscous liquids with a manure like odor The  $\alpha$ -phenylbutyric, valeric and heptonic acids, upon cooling and standing, solidified to masses of crystals The first two members of the series to be examined, benzoic acid, m p 121.5–122° C (corr) and phenylacetic acid, m p 77.2–77.7° C (corr), were Eastman Kodak products, recrystallized from hot water When cooled in liquid ammonia, the liquid members of the series solidified but did not crystallize The  $\alpha$ -phenyl derivatives of propionic, butyric and valeric acids have been prepared by previous workers by the hydrolysis of the corresponding nitriles The boiling points and analyses of the acids prepared in our work are given in Table I

TABLE I

$\alpha$ Phenyl Derivative of	B P (corr)	Formula	Carbon %		Hydrogen %	
			Calc	Found	Calc	Found
n-Propionic acid	132–34 <sub>s</sub>	C <sub>9</sub> H <sub>10</sub> O	71.9	72.4	6.67	6.59
n Butyric acid	141–44 <sub>s</sub>	C <sub>10</sub> H <sub>12</sub> O	73.2	73.1	7.32	7.34
n Valeric acid	153–57	C <sub>11</sub> H <sub>14</sub> O	74.2	73.8	7.86	7.66
n-Caproic acid	161–65.7	C <sub>11</sub> H <sub>16</sub> O <sub>2</sub>	74.8	74.7	8.32	8.25
n Heptonic acid	179–82.1 <sub>s</sub>	C <sub>13</sub> H <sub>18</sub> O	75.7	76.0	8.73	8.55

*Solubilities of the Acids*—The solubilities of the acids were determined at 30° C and 40° C, using a rotating apparatus, similar to that described by Noyes (14), carrying four sixty-cubic centimeter wide-mouth bottles The entire apparatus was immersed in a thermostat, capable of temperature control to within five-hundredths degree Fifty cubic centimeters of boiled distilled water were placed in each bottle together with an excess of acid, the solubility of which was to be determined The bottles were rotated from five to six hours at the desired temperature and then placed in an upright position in the bath to permit clarification A pipette, to which was attached a cotton-filled bulb for filtration, was used to remove portions of the solution from each bottle These portions were run into dry, tared, glass stoppered weighing bottles and weighed The contents of each bottle were titrated with N/100 sodium hydroxide, using phenolphthalein as an indicator Before titration dry oxygen was bubbled through the solution to displace carbon dioxide See Table II and Fig 1

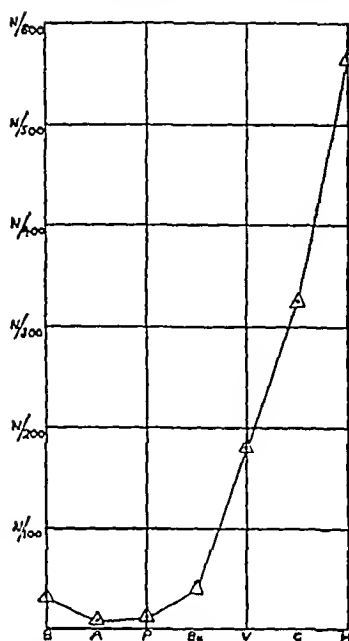


Fig 1—Solubilities of acids expressed as molalities at 30° C

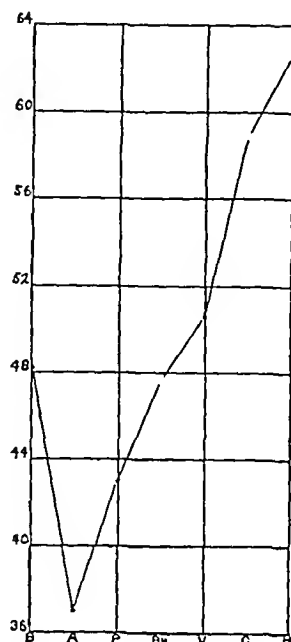


Fig 2—Distribution coefficients  $C_2/C_1$ , of acids between animal charcoal and water using N/600 solutions

TABLE II—SOLUBILITIES OF ACIDS EXPRESSED IN GRAMS OF ACID DISSOLVED IN ONE HUNDRED GRAMS OF WATER

Acid	30° C	40° C
Benzoic	0.408	0.552
Phenylacetic	2.068	3.334
$\alpha$ Phenylpropionic	1.2154	1.3325
$\alpha$ Phenylbutyric	0.4230	0.4445
$\alpha$ Phenylvaleric	0.0978	0.1854
$\alpha$ Phenylcaproic	0.0591	0.0633
$\alpha$ Phenylheptic	0.0365	0.0416

**Adsorption of Acids on Bone Black**—The adsorption of the acids on animal charcoal was determined using N/100 solutions of the acids as starting concentration wherever possible and approximately saturated solutions in other cases. The high dilutions of acids used rendered duplication of values very difficult, but by determining the coefficients of all the acids at one time under approximately constant conditions, values were obtained from which could be plotted a curve showing the variation in adsorption with increase in molecular weight. It will be observed that the ratio of the concentrations,  $i.e.$ ,  $C_2/C_1$ , is not a constant but increases with decrease in concentration. From the data obtained, it appears that the adsorption process follows an equation similar to that of Freundlich (15),  $\ln C_2 = \ln k + \frac{1}{n} \ln C_1$ . Widely varying values for the constants  $k$  and  $n$  were obtained when the data observed was substituted in the adsorption formula.

To twenty-five cubic centimeters of the diluted acid solutions was added one-tenth Gm of animal charcoal and the solutions agitated thoroughly at five minute intervals for twenty minutes, filtered, and twenty cubic centimeters of the filtrate titrated with  $N/100$  sodium hydroxide from a micro burette using phenolphthalein as an indicator See Table III and Fig 2

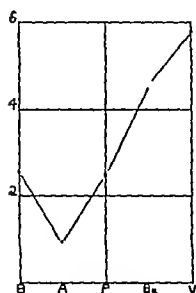


Fig 3 —Distribution coefficients,  $C/C_1$  of acids between oil and water, using  $N/600$  solutions

*Partition Coefficient between Oil and Water*—Twenty five cubic centimeters of fresh cottonseed oil were added to twenty-five cubic centimeters of a solution of the acid The same dilutions of acids were used as in the adsorption experiments The oil and solution mixture was rotated for five hours at room temperature Twenty cubic centimeters of the aqueous layer were pipetted off and titrated with  $N/100$  sodium hydroxide, phenolphthalein as indicator The last two members of the series were not included in this test See Table IV and Fig 3

*Surface Tension of the Acid Solutions*—The surface tensions of  $N/600$  solutions, so as to include the entire series, were determined using a du Nouy Tensiometer at  $24.5^\circ \text{C}$  The water used in making the dilutions gave a reading of 73.7 dynes/cm at this temperature It was observed that the surface tension

TABLE III —ADSORPTION ON ANIMAL CHARCOAL EXPRESSED BY THE VALUES OF  $C/C_1$

$C$  = Millimols of solute per Gm of animal charcoal

$C_1$  = Millimols of solute per milliliter of solution

Normality	B	A	P	Bu	V	C	H
1/100	8.81	7.8	9.44	10.8			
1/200	20.05	14	19.65	18.9			
1/300	30.85	19.7	22.7	25.2	26.3		
1/400	38.4	31	27.5	30.5	35.5	24.5	
1/500	46.7	36.8	41	34.1	41.6	39.6	
1/600	48.2	37.1	43.1	47.7	49.6	58.8	62.5

TABLE IV —PARTITION COEFFICIENT  $C/C_1$  BETWEEN OIL AND WATER

$C_2$  = Gm acid per twenty-five cubic centimeters of oil

$C_1$  = Gm acid per twenty five cubic centimeters of solution

Normality	B	A	P	Bu	V
1/100	5.55	1.93	4.31	11.14	
1/200	4.96	1.58	3.9	8.48	
1/300	3.85	1.55	3.25	5.98	
1/400	3.09	1.24	2.98	5.08	7.12
1/500	3.03	1.15	2.64	4.78	5.96
1/600	2.64	0.96	2.54	4.63	5.77

of the water was lowered by all of the acids but no definite relationship between increasing side chain length and surface tension lowering could be inferred from the data obtained It is a well-known and recognized fact that surface tension lowering does not alone serve as a criterion for a good antiseptic, but that other factors may enter into the bactericidal action

*Bactericidal Values of the Acids*—Proper dilutions of the acids were made from relatively concentrated solutions Phenylheptioic acid could not be included

in the tests because of limiting solubility. The test organism used was a 22-26-hour culture of *Bacillus coli* (Harris strain), incubated and grown at 37.5° C on nutrient broth. The stock culture was carried on agar slants of the same composition as the broth medium plus one and one-half per cent agar. When the test organism had not been transferred daily, four or five daily transfers were made before using it for testing purposes. Transfers and inoculations were made with a four-millimeter loop. Five-tenths cubic centimeter of a suspension of *B. coli* was added to four and one-half cubic centimeters of nutrient broth. One-tenth cubic centimeter of this suspension was then added to five cubic centimeters of the acid solutions. The organism was allowed to stand in the acid solution for an hour at 37.5° C and was then inoculated into nutrient broth and incubated for forty-eight hours at 37.5° C. A test with phenol was added as a comparator for bactericidal action. See Table V and Fig. 4.

#### DISCUSSION

It will be observed that an unlimited increase in germicidal activity with increasing molecular weight is prevented by the decreasing solubility which also accompanies increasing molecular weight. With this series and the test organism used, the practical bactericidal efficiency appears to reach a maximum at the C<sub>6</sub> acid. All of the series, with the exception of benzoic acid, are expensive or difficult to prepare, and have a disgusting odor, two factors which would limit their use as practical antiseptics.

As pointed out by Tattersfield (4) and Daniels and Lyons (10), no one of the physical properties entirely accounts for the toxicity shown by the fatty acids.

TABLE V—DILUTIONS OF ACIDS WHICH WILL INHIBIT THE GROWTH OF *B. coli* IN ONE HOUR

Acid	Dilution	Acid	Dilution
Phenol	1-180	$\alpha$ Phenylbutyric	1-1600
Benzoic	1-800	$\alpha$ Phenylvaleric	1-3000
Phenylacetic	1-600	$\alpha$ Phenylcaproic	1-5700
$\alpha$ Phenylpropionic	1-1000		

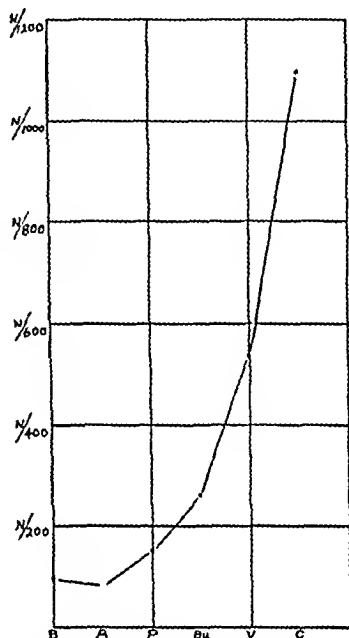


Fig. 4—Bactericidal values of acids expressed as normalities

#### SUMMARY

1 By the hydrolysis of the corresponding nitriles, a series of  $\alpha$ -phenyl-substituted acids has been prepared, and their solubilities determined in water at 30° C and 40° C.

2 The curves showing the solubilities of the acids, the adsorption by animal charcoal of the acids from their aqueous solutions and the distribution coefficients between oil and water parallel that of the bactericidal action of the series, using *B. coli* as the test organism.

3 The bactericidal action of these acids appears to be a function of solubility, side chain length, adsorption by animal charcoal distribution coefficient between oil and water and surface tension lowering

#### LITERATURE CITED

- (1) Duggan *Amer Chem J* 7 (1885-1886), 62
- (2) Siegler and Popenoe, *J Agr Research* 29 (1924), 259
- (3) Siegler and Popenoe *J Econ Entomol*, 18 (1925) 292
- (4) Tattersfield *J Agri Sci* 17 (1927) 181 *Ann Appl Biol* 14 (1927), 231
- (5) Loeb *Biochem Z*, 15 (1909), 254-271
- (6) Ishiura *Z Immunitats*, 40 (1924), 429
- (7) Halvorson and Cade, *Proc Soc Exptl Biol Med* 25 (1928) 506
- (8) Levine Peterson and Buchanan *Ind Eng Chem*, 20 (1928), 63
- (9) Laws *J Physiol*, 17 (1894-1895), 360 *Chem News* 71 (1895) 15
- (10) Daniels and Lyons *J Phys Chem*, 35 (1931) 2049
- (11) To be published in the *J Am Chem Soc* July issue 1933 or later
- (12) Pickard and Yates *J Chem Soc* 95 (1909) 1017
- (13) Bodroux and Taboury *Bull soc chim* 7 (1910), 666 670 732
- (14) Noyes *Z physik Chem* 9 (1892) 606
- (15) Freundlich *Ibid* 57 (1907) 385

DEPARTMENT OF CHEMISTRY  
NOTRE DAME INDIANA

### THE CONSTITUENTS OF WU CHU YU (*EVODIA RUTÆCARPA*) \*

BY A LING CHEN AND K K CHEN

Wu Chu Yu is the fruit of a shrub and has been used for a long time in Chinese medicine as a drug for the treatment of headache, abdominal pain, dysentery, cholera, worm infestations and postpartum disturbances (1) Botanically, the plant has been identified as *Evodia rutæcarpa*, family rutaceæ (2) The crude drug is easily available from Chinese drug stores Our supply came from Tientsin, China Each fruit consists of small black carpels, five in number, with short stalks, weighs on the average 10.3 mg, has an aromatic odor and is hot and bitter to the taste, similar to black pepper

Chemical studies on Wu Chu Yu have been undertaken by several Japanese investigators Keimatsu (3) reported the isolation of an indifferent crystalline substance, having the empirical formula  $C_{18}H_{22}O_6$ , which he named evodin Asahina and Ishio (4) presented evidence that the formula of evodin was  $C_{17}H_{20}O_9$  In addition, Asahina and Kashiwaki (5) succeeded in isolating two alkaloids, evodiamine and rutæcarpine, having the formulas  $C_{19}H_{17}ON_3$  and  $C_{18}H_{13}ON_3$ , respectively During the following fourteen years, Asahina and his associates published data on the chemical structures of both evodiamine and rutæcarpine, and finally their syntheses (6), (7), (8), (9), (10), (11), (12), (13)

Our chief interest in Wu Chu Yu was to obtain in an amount sufficient for pharmacological study the principles known to be present in the fruit In the process of separation, we obtained evodiamine and rutæcarpine, and by elementary analyses and molecular weight determinations we confirmed Asahina's formulas With regard to the non-nitrogenous substance, evodin, our results differ from those

\* From the Lilly Research Laboratories Eli Lilly and Company Indianapolis

of Keimatsu (3) and Asahuna and Ishio (4) Furthermore, we isolated a fourth compound which contains nitrogen and has the provisional formula,  $C_{13}H_{13}O_2N$  We named it wuchuyine

Our pharmacological work has been deferred because of the fact that the four substances are very slightly soluble in water and do not easily form soluble salts or derivatives, and it therefore appears desirable to make a brief report of our chemical findings at the present time

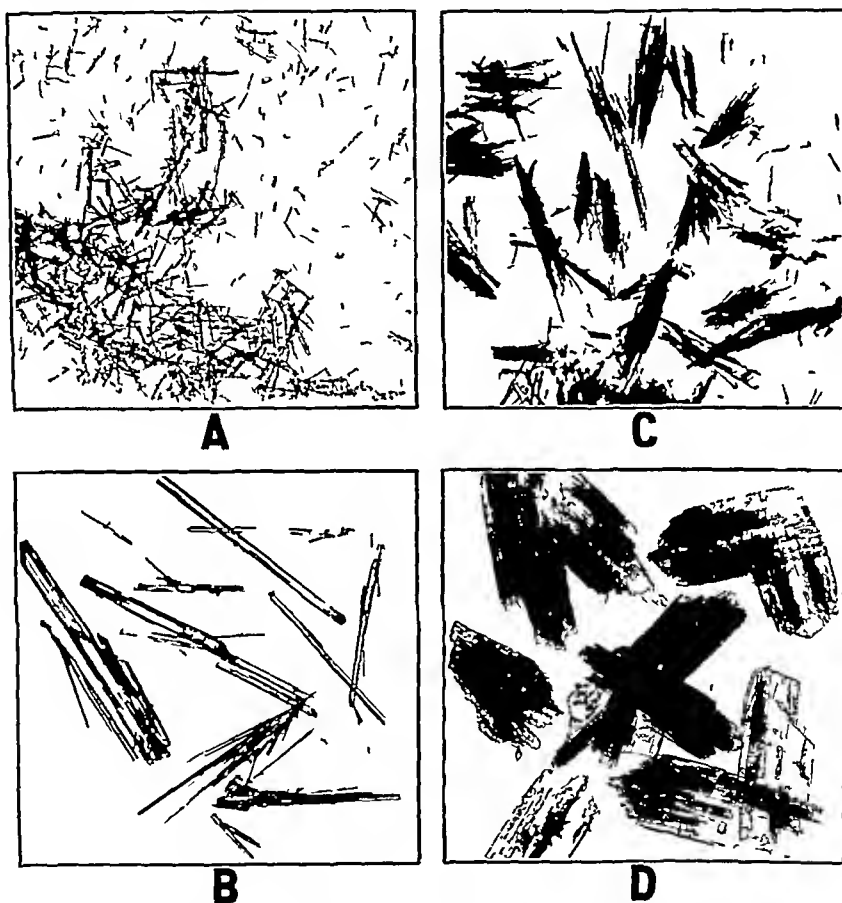


Fig 1 —Crystalline forms of the constituents of Wu Chü Yü

A Rutacarpine

C Wuchuyine

B Evodiamine

D Evodine

#### EXPERIMENTAL

Five Kg of the pulverized material were percolated with acetone until extraction was almost complete The acetone of the percolate was removed by distillation under diminished pressure, and the syrupy liquid was treated with a 2.5 per cent solution of sodium hydroxide and a small volume of ether, both of which dissolved out large amounts of impurities A mass of yellow powder which con-

tained a mixture of the four different constituents was separated by filtration under suction. This mass was dried, washed with ethyl alcohol and again filtered. The powder was then dissolved in hot acetone. Upon standing in an ice chest over night, a large crop of crystals of various forms was obtained.

A portion of the crystals was soluble in warm benzene and crystallized out upon cooling. This was found to be chiefly rutæcarpine and was purified by repeated crystallization from ethyl alcohol.

The benzene-insoluble fraction was treated with cold acetone. At this point there was a part that did not readily go into solution, so it was separated and dissolved in warm acetone. After repeated crystallizations, it proved to be evodine.

The acetone-soluble portion was subjected to slow evaporation and crystallization. By washing the crop of crystals with chloroform, in which evodiamine is soluble, wuchuyine was separated. Both compounds were purified by repeated crystallizations from acetone.

*A Rutæcarpine* crystallizes from ethyl alcohol in fine needles (see Fig. 1<sup>1</sup>), slightly yellow in color, melts at 261.5–262° C (corrected), is optically inactive and is soluble in acetone, warm benzene and to a less extent in ethyl alcohol. A solution of rutæcarpine has a green fluorescence. Analysis:<sup>2</sup>

4.902 mg substance	13.570 mg CO <sub>2</sub>	2.020 mg H <sub>2</sub> O
4.784 mg substance	13.230 mg CO <sub>2</sub>	1.910 mg H <sub>2</sub> O
4.764 mg substance	13.155 mg CO <sub>2</sub>	1.990 mg H <sub>2</sub> O
2.998 mg substance	0.383 cc N at 24° and 758 mm	
2.946 mg substance	0.380 cc N at 24° and 758 mm	
2.770 mg substance	0.360 cc N at 23° and 750 mm	
0.238 mg substance in 4 mg camphor	6.9° Δ	
0.290 mg substance in 5 mg camphor	6.9° Δ	
C <sub>18</sub> H <sub>13</sub> ON <sub>3</sub> calculated	C 75.27, H 4.56, N 14.64	molecular weight 287
Found	C 75.52, H 4.61, N 14.63	molecular weight 312
	C 75.45, H 4.47, N 14.77	molecular weight 303
	C 75.39, H 4.68, N 14.79	

*B Evodiamine* crystallizes from acetone as colorless needles, begins to soften at 265° C and melts at 272–273° C (corrected), has an optical rotation of  $[\alpha]_D^{25} +251^\circ$  and is soluble in acetone and slightly soluble in benzene and alcohol.

4.840 mg substance	13.360 mg CO <sub>2</sub>	2.470 mg H <sub>2</sub> O
4.732 mg substance	13.060 mg CO <sub>2</sub>	2.410 mg H <sub>2</sub> O
4.888 mg substance	13.480 mg CO <sub>2</sub>	2.510 mg H <sub>2</sub> O
3.067 mg substance	0.371 cc N at 24° and 758 mm	
3.035 mg substance	0.364 cc N at 23° and 758 mm	
2.918 mg substance	0.355 cc N at 22° and 750 mm	
0.213 mg substance in 3 mg camphor	7.2° Δ	
0.200 mg substance in 4 mg camphor	5.3° Δ	
C <sub>19</sub> H <sub>17</sub> ON <sub>3</sub> calculated	C 75.22, H 5.65, N 13.83	molecular weight 303
Found	C 75.31, H 5.71, N 13.86	molecular weight 310
	C 75.30, H 5.70, N 13.79	molecular weight 310
	C 75.24, H 5.75, N 13.89	

<sup>1</sup> The microphotographs of the crystals were made by Mr. C. R. Eckler to whom we are greatly indebted.

<sup>2</sup> The analyses reported in this paper were made by Dr. Ing. A. Schoeller, Berlin-Schmargendorf, Germany.

*C. H. wuchuyine* crystallizes from acetone in small, colorless tufts, melts at  $237.5^{\circ}\text{C}$  (corrected), has an optical rotation of  $[\alpha]_{\text{D}}^{20} -68^{\circ}$ , and is soluble in acetone and slightly soluble in alcohol. Analysis

5 000 mg substance	13 240 mg CO <sub>2</sub>	2 590 mg H <sub>2</sub> O
5 092 mg substance	13 480 mg CO <sub>2</sub>	2 600 mg H <sub>2</sub> O
4 869 mg substance	12 860 mg CO <sub>2</sub>	2 460 mg H <sub>2</sub> O
3 136 mg substance	0 167 cc N at $23.5^{\circ}$ and 762 mm	
2 991 mg substance	0 157 cc N at $22.5^{\circ}$ and 762 mm	
3 006 mg substance	0 159 cc N at $22.5^{\circ}$ and 762 mm	
0 348 mg substance in 5 950 mg camphor	$8.0^{\circ}\Delta$	
0 301 mg substance in 4 650 mg camphor	$8.9^{\circ}\Delta$	
$\text{C}_{13}\text{H}_{13}\text{ON}$ calculated	C 72.56	H 6.09 N 6.52 molecular weight 215
Found	C 72.24	H 5.80 N 6.15, molecular weight 292
	C 72.24	H 5.71, N 6.09, molecular weight 291
	C 72.07	H 5.65 N 6.13

The above formula is given with reservation, especially since the analytical results do not entirely check with the theoretical values.

*D. Evodin* crystallizes from acetone in colorless plates, melts at  $290.5\text{--}291^{\circ}\text{C}$  (corrected), has an optical rotation of  $[\alpha]_{\text{D}}^{20} -131.4^{\circ}$  and is only moderately soluble in acetone. Analysis

4 898 mg substance	11 890 mg CO <sub>2</sub>	2 830 mg H <sub>2</sub> O
4 948 mg substance	11 970 mg CO <sub>2</sub>	2 820 mg H <sub>2</sub> O
4 875 mg substance	11 805 mg CO <sub>2</sub>	2 830 mg H <sub>2</sub> O
0 354 mg substance in 6 120 mg camphor	$5.0^{\circ}\Delta$	
0 273 mg substance in 5 100 mg camphor	$4.5^{\circ}\Delta$	
$\text{C}_{13}\text{H}_{13}\text{O}_8$ calculated	C 66.39	H 6.89 molecular weight 470
Found	C 66.21	H 6.47, molecular weight 462
	C 66.03	H 6.38, molecular weight 477
	C 66.07	H 6.50

#### SUMMARY

By a chemical study of Wu Chu Yu, or the fruit of *Evodia rutacarpa*, four crystalline substances have been obtained: (a) *rutacarpine*,  $\text{C}_{13}\text{H}_{13}\text{ON}_3$ , (b) *evodiamine*,  $\text{C}_{11}\text{H}_{17}\text{ON}_3$ , (c) *wuchuyine*,  $\text{C}_{13}\text{H}_{13}\text{O}_2\text{N}$ , and (d) *evodin*,  $\text{C}_{26}\text{H}_{30}\text{O}_8$ .

#### BIBLIOGRAPHY

- (1) S. C. Li, Pentsao Kang Mu (1596) Chapter 32
- (2) Botanical Nomenclature, Commercial Press (1917), page 437
- (3) K. Keimatsu, *Yakugakuzasshi (J. Pharm. Soc. Japan)* No 248 (1902) 979
- (4) Y. Asahina and M. Ishio, *Yakugakuzasshi* No 404 (1915) 1148
- (5) Y. Asahina and K. Kashiwaki, *Ibid.*, No 405 (1915) 1273
- (6) Y. Asahina and A. Mayeda, *Ibid.* No 416 (1916) 871
- (7) Y. Asahina and A. Fujita, *Ibid.*, No 476 (1921) 863
- (8) Y. Asahina, *Ibid.* No 503 (1924), 1
- (9) Y. Asahina and T. Ohta, *Ibid.*, No 530 (1926) 293
- (10) Y. Asahina and T. Ohta, *Ibid.*, 48 (1928) 313
- (11) Y. Asahina and T. Ohta, *Ibid.* 49 (1929), 1162
- (12) Y. Asahina and T. Ohta, *Ber. deut. chem. Gesellsch.* 61B (1928) 319
- (13) Y. Asahina and T. Ohta, *Ibid.* 61B (1928) 869



## CHEMICAL STUDY OF TWO CHINESE DRUGS \*

BY DANIEL TSAO AND E V LYNN

## FANG FÊNG

According to Stewart, "Chinese Materia Medica," fang fêng is obtained from *Siler dwarficatum*, *Peucedanum rigidum* or *Peucedanum terebinthaceum*. It is found in most of the central and northern provinces. The stems are 2-3 feet high, the leaves are coriaceous and glabrous and the flowers are white and have five petals. Although all parts of the plant are used in medicine, the name chiefly refers to the root, which appears on the market in long, brownish yellow, irregularly branching pieces, often with some of the stem attached. It has a sweet, aromatic and mucilaginous taste.

The drug is given in all diseases due to damp and chill, in disorders of the circulation and in general debility, also to cure headache and dizziness attributed to chill. The name fang means "prevent" and fêng means "chill." It is also regarded as an efficient antidote in aconite poisoning.

The material employed in this investigation was bought in the open market. After being ground to a coarse powder, it was subjected to a proximate analysis by methods of the A. O. A. C. The results follow in per cent.

		II	Average
Volatile at 100° C	11 81	11 86	11 84
Total ash	4 33	4 40	4 34
Reducing sugars	6 48	6 31	6 40
Sucrose by reduction	3 23	3 15	3 19
Pentosans	11 51	11 42	11 46
Starch by acid hydrolysis	2 27	2 16	2 21
Starch by diastase	1 71	1 50	1 60

Two samples of 10 Gm. each were introduced into Soxhlet extractors and submitted to selective action with several solvents for 18 hours each. The residues left after spontaneous evaporation of the solvents were dried to constant weight in a desiccator, then the volatile portion in the first two was estimated by heating again to constant weight at 110° C. The results follow in percentage of dried material.

	I	II	Average
Petroleum ether total	2 23	2 13	2 18
volatile	0 51	0 51	0 51
Ether, total	1 16	1 32	1 24
volatile	0 36	0 41	0 38
Alcohol	7 93	7 87	7 90
Water	13 23	14 31	13 77

**Tannin**—The alcohol was evaporated from a fluidextract made according to Type A, U. S. P. X, and the residue was taken up with water and filtered. Portions of the yellowish brown solution were tested with neutral ferric chloride solution, with potassium ferricyanide and ammonia water and with lime water. Since none of the reagents gave a positive reaction, one can presume that tannins are absent.

**Alkaloid**—A fluidextract was made from 50 Gm. of the drug, using as solvent

\* Scientific Section, A. P. H. A. Toronto meeting, 1932.

an acidified mixture of alcohol and water (5 1) The filtered solution was made alkaline with ammonia and was extracted with ether-chloroform (2 1) The ethereal solution was then exhausted with normal sulphuric acid and this was treated with the following reagents Selchibler's, Wagner's, Maycr's, Hager's, tannic acid T S and neutral tannin T S The first two gave slight precipitates which disappeared on standing, but the others gave none, indicating strongly that no alkaloid is present in the original drug

*Acids*—A mixture of 1 Gm of the sample and 15 cc of neutral alcohol was set aside for 24 hours and then filtered The solution was titrated with tenth-normal sodium hydroxide using phenolphthalein as indicator Calculated as acetic acid, the results were 1 77 and 1 85 per cent An aqueous extraction in the same way gave 1 03 and 1 09 per cent Tests of the distillate from the aqueous extraction showed that none of the acid is volatile On the other hand, none of the water-soluble acid seemed to be withdrawn by ether Silver sulphate gave only 0 13 per cent of precipitate, while silver nitrate was rapidly reduced in the cold to metallic silver Attempts to precipitate the acid by calcium or barium were only partly successful, since the amount obtained was very small The nature of the acid must remain for the time being undetermined

*Toxicity*—Several experiments were made on rats, using amounts of alcoholic and aqueous extracts equivalent to 1 Gm of the drug per oral dose In spite of this high amount, no abnormal symptoms could be observed during 12 hours after administration, and one is justified in assuming that the material is fairly safe

### HSIUNG CH'UUNG

Much confusion in names seems to have occurred with this drug, since various parts of the plant and different varieties are given separate designations in Chinese materia medica The root, which is the usual drug, is also called Ch'uan Hsiung, Hsiang Kuo and Hu Ch'ung It is derived from *Comoselinum unvittatum Turcz* (*Cnidium officinale Makino*), an umbelliferous plant which is best cultivated The active ingredient is a volatile oil which has been examined repeatedly and whose chief constituent seems to be a lactone The roots are recommended for a great variety of ailments, such as colds, headaches, anemia, menorrhagia, retained placenta, sterility, pains and aches of all kinds, rheumatism, etc

A sample of the roots bought in the open market was first subjected to proximate analysis, with the following results in percentage

	I	II	Average
Volatile at 100° C	10 87	10 77	10 82
Total ash	3 05	2 98	3 01
Reducing sugars	None		
Starch by acid hydrolysis	28 39	29 51	28 95
Protein (N × 6 25)	2 47	2 04	2 26
Ether extract	9 54	9 78	9 66
Crude fibre	4 80	4 57	4 68
Tannin	0 34	0 42	0 38

Qualitative tests for alkaloid, made as before, were negative Results from selective extraction were as follows

	I	II	Average	
Petroleum ether, total	7 58	7 48	7 53	Yellow
volatile	0 75	0 55	0 65	
Ether, total	8 29	8 31	8 30	Yellow
volatile	1 16	1 28	1 22	
Alcohol	15 83	15 63	15 73	Brown
Water	16 43	16 43	16 43	Brown

The most interesting feature of the drug is the large amount of fixed oil which it contains. In order to examine this more closely an ether extraction was made of about 500 Gm and the volatile oil was removed by distillation. The collected fat was then dried and its constants were determined. They are: specific gravity at 25° C, 0.94672, index of refraction at 25° C, 1.4821, acid number, 31.5 and 31.9, saponification number, 205.2 and 200.4, ester number, 171.1, unsaponifiable residue, 1.55 and 1.64, iodine number, 70.34 and 71.2, Reichert-Meissl number, 0.1, Polenski number, 0.25, solid acids, 10.78, liquid acids, 89.22, titer test, 24.3° C. Several drying experiments showed that the oil is only about 80 per cent as efficient as raw linseed oil.

The free fatty acids were isolated by saponification from 75 Gm of the fat, giving about 70 Gm of dried material, which had an index of refraction of 1.4781 at 25° C. This was submitted to distillation at 10-mm pressure. The first portion, coming over at 50–60° C was solid and gave a titer test of 56–57° C. From 60° to 117° only 0.5 Gm distilled and then decomposition set in. The residue had an acetyl value of 11.42, indicating a high per cent of hydroxy acids.

*Phytosterols*—During ether extraction there separated from the solution a white substance amounting to 0.6 per cent of the drug. From this ethyl acetate extracted an apparently pure substance melting at 182–183°, from the residue alcohol or chloroform withdrew one with a melting point of 207–207.5° and ether gave still a third material melting at 214.5°. Careful repurification did not seem to alter the melting temperatures, but mixtures of them gave much lower values. All of them gave reactions of the phytosterols but well-defined acetates could not be obtained, the white solids resulting gave indistinct melting points between 147° and 156° C. From the unsaponifiable residue there was obtained still a fourth phytosterol in the form of needles melting at 137° C. Lack of material prevented any further examination of these interesting materials.

#### SUMMARY

Fang fêng contains no alkaloids or tannin and has no appreciable effect on rats even in high dosage. The chief constituents appear to be sugars, gums and free acids.

Hsiung Ch'iung contains chiefly fixed and volatile oils. The former is of the drying class and has a high content of hydroxy acids. From this drug were isolated several phytosterols.

SEATTLE, WASH  
October 1 1932

---

The American Institute of Pharmacy is dedicated to those who have given of their thought and endeavor to the improvement of Public Health and to the further advancement of Science in Pharmacy.

THERAPEUTIC SUBSTANCES DERIVED FROM UNSYMMETRICAL  
DIPHENYL COMPOUNDS I \*

BY S E HARRIS AND W G CHRISTIANSEN

## SOME MERCURY DERIVATIVES OF 2- AND 4-HYDROXYDIPHENYL

The studies of diphenyl compounds in this laboratory have included the preparation of a number of mercury derivatives of the following types, (a) from nitrated hydroxy-diphenyls, (b) from brominated hydroxy-diphenyl, (c) from diphenyl-phenolphthalein

The compounds were tested for their activity against bacteria and were shown to have valuable bactericidal properties. Table I illustrates the activity against *B Typhosus*, the second column giving the minimum concentration at which the organism is killed in five minutes. The mercury compound was dissolved in the smallest excess of NaOH which would give a clear solution at 1-500, and diluted with distilled water immediately prior to the test.

TABLE I

Germicide	Dilution Killing <i>B Typhosus</i> in 5 Minutes
2-Acetoxy-mercuri-3 nitro-4-hydroxy diphenyl	1-2000
4-Acetoxy-mercuri-3,5 dinitro-2-hydroxy diphenyl	1-1000
4-Anhydro mercuri-5 acinitro 3 nitro 2 hydroxy-diphenyl	1-1000
4,6 Diacetoxy mercuri-3,5 dinitro 2 hydroxy-diphenyl	1-2500
Diacetoxy mercuri-4' nitro-2-hydroxy-diphenyl	1-2500
Hydroxy-mercuri-3,3' diphenyl 5,5'-dibromo-phenolphthalein	1-1250
Diacetoxy mercuri-3,3'-diphenyl 5,5'-dinitro-phenolphthalein	1-2500
Monoacetoxy mercuri-3,3'-dinitro-phenolphthalein	1-1000
Diacetoxy mercuri-3,3'-dinitro-phenolphthalein	1-500
2 Phenyl-4-bromo 6 acetoxy-mercuri-phenoxy-acetic acid	1-100

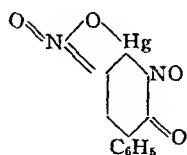
The mercury derivatives of nitrophenolphthalein were prepared for comparison with the corresponding derivatives of diphenyl-phenolphthalein, and it will be noted that the introduction of the phenyl groups considerably raises the germicidal activity. In addition to the compounds contained in the above table, the mercury derivatives of condensation products of 2-hydroxy-diphenyl with isatin were studied. These will be dealt with in a separate communication.

The preparation of the mercury derivatives offered few difficulties. Mercuriation was carried out by treating a boiling alcoholic solution of the suitable intermediate with an aqueous solution of mercuric acetate acidified with acetic acid, and refluxing until a filtered test portion showed absence of ionic mercury when tested with aqueous NaOH or ammonium sulphide. The mercury derivatives were thus obtained as alcohol-insoluble powders which were purified by reprecipitation from filtered alkaline solutions by means of acetic acid. They were in all cases insoluble in the common organic solvents but some were slightly soluble in boiling glacial acetic acid. In no case was a melting point observed, complete decomposition without melting taking place at temperatures above 300° C. The solubility in aqueous alkalis showed wide variations, the mercury derivative of 5-bromo-2-hydroxy-diphenyl being completely insoluble even in a large excess of boiling NaOH.

\* Scientific Section A. P. H. A., Toronto meeting 1933

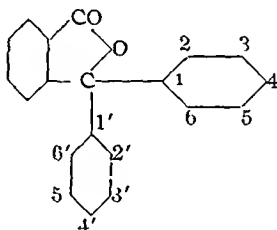
The mercury derivatives of the nitro-hydroxy-diphenyls and of the diphenyl phenolphthaleins, however, were readily soluble in a moderate excess of alkali.

While the mercuration of 3,5-dinitro-2-hydroxy-diphenyl in alcohol solution proceeds normally, an attempt to mercurate this compound in aqueous acetic acid led to the formation of the anhydro-acinitro compound



This dissolved in alkalis only on prolonged boiling. The structure was assigned on solubility in alkali, the analytical results and the strong orange color of the solid substance, both the mono- and dimercury derivatives of 3,5-dinitro-2-hydroxy diphenyl being pale yellow.

No attempt has been made to establish the position taken by the mercury entering the molecule. In the simpler derivatives analogy with known cases has been assumed, while the diphenyl-phenolphthaleins offer a special problem. White (1) was unable to mercurate phthaleins in which 3,3' and 5,5' positions were all occupied.



Under different experimental conditions, however, Greenbaum (2) prepared mercury derivatives of such compounds and assumed that the mercury entered the phthalic acid nucleus. We found that both 3,3', 5,5' tetra substituted and 3,3' disubstituted phthaleins were mercurated with equal facility, although it was not always possible to introduce more than one mercury group, *e g*, into 3,3'-diphenyl 5,5'-dibromo phenolphthalein. This would suggest that here the mercury enters the phthalic acid residue, while in the case of 3,3'-diphenyl-5,5'-dinitrophenol phthalein, which readily yielded a dimercury derivative, one or both of the mercury groups enters a phenol nucleus.

Analysis for mercury was carried out by the method of Whitmore (3). The results were not entirely satisfactory and the method has been discarded in favor of a method described by Tabern and Shellberg in a private communication through the A. D. M. A. Committee on Synthetic organic chemicals.

*Experimental* — 2-acetoxy-mercuri-3-nitro-4-hydroxy-diphenyl. The preparation of this compound is typical of the general method and is described in detail.

21.5 Gm of 3-nitro-4-hydroxy diphenyl (4) were dissolved in 200 cc of alcohol and the solution heated to boiling under reflux. 28.7 Gm of mercuric acetate dissolved in 200 cc of

water, acidified with 0.5 cc glacial acetic acid were then slowly added to the boiling solution. Brisk agitation during the addition and subsequent boiling prevented the product from sticking to the sides of the flask. When a side test showed absence of ionic mercury the brick red precipitate was filtered from the hot solution and washed with alcohol and ether. The yield was practically quantitative. On dissolving in boiling NaOH and cooling the sodium salt was thrown down as a scarlet powder which was largely hydrolyzed when treated with water.

The analysis of this as well as the other mercury compounds is given in Table II.

TABLE II—MERCURY DERIVATIVES

Compound	Found	Analysis	Calculated
2 Acetoxy mercury 3 nitro-4 hydroxy diphenyl	N 2.82		2.95
$C_{14}H_{11}NO_5Hg$	Hg 41.6		42.4
Na salt 2 AcOHg 3NO <sub>2</sub> -4HO diphenyl	Hg 42.7		44.3
$C_{14}H_{10}NO_5HgNa$			
4 AcOHg-3,5 di NO-2 HO diphenyl	Hg 38.7		38.7
$C_{14}H_{10}N_2O_7Hg$			
4,6 DiAcOHg-3,5 di NO-2 HO diphenyl	Hg 51.2		51.5
$C_{16}H_{11}N_2O_8Hg$			
3 NO <sub>2</sub> -2 anhydro Hg 5 acinitro 2 oxy diphenyl	Hg 43.5		43.8
$C_{12}H_8N_2O_6Hg$	N 6.18	6.05	6.10
D <sub>1</sub> AcOHg-4' NO-2 HO diphenyl	Hg 53.2		54.9
$C_{18}H_{13}NO_7Hg$			
3 AcOHg-5 Br-2 HO diphenyl	Hg 35.9		38.8
$C_{14}H_{11}O_5BrHg$			
5 AcOHg-2 phenyl-4 Br phenoxy acetic acid	Hg 31.0		35.5
$C_{14}H_{11}O_5BrHg$			
HOHg-3,3' diphenyl 5,5' dibromo phenolphthalein	Hg 26.6, 26.1		23.8
$C_{27}H_{20}O_4Br_2Hg$			
D <sub>1</sub> AcOHg 3,3' diphenyl 5,5' dinitro phenolphthalein	Hg 38.2		37.3
$C_{26}H_{18}O_4N_2Hg$			
AcOHg-3,3'-dinitro phenolphthalein	Hg 32.8, 33.0		30.1
$C_{22}H_{14}N_2O_6Hg$			

### 3 NITRO-4 ANHYDRO-MERCURY 5 ACINITRO 2 OXY-DIPHENYL

2.6 Gm of 3,5 dinitro 2 hydroxy diphenyl (5) were dissolved in 31 cc *N* NaOH and heated to boiling. 3 Gm of mercuric acetate dissolved in 50 cc of water and 10 cc glacial acetic acid were added and the mixture boiled and stirred for 20 hours. The bright orange product which had gradually become granular during the reaction was filtered off and washed with water, alcohol and ether. It dissolved in NaOH only on boiling and decomposed without melting above 300° C.

### 4' NITRO 2 HYDROXY DIPHENYL (a) 4'-NITRO 2 AMINO DIPHENYL

This compound has previously been prepared (6) but the following directions give an improved yield.

167 Gm cone H<sub>2</sub>SO<sub>4</sub> were cooled to 0° C and 24 Gm 2 amino diphenyl added in small portions with good agitation. The solution was then cooled below 0° C and a cooled mixture of 13 Gm HNO<sub>3</sub> and 10 Gm H<sub>2</sub>SO<sub>4</sub> added at such a rate that the temperature remained below 0° C. Vigorous stirring was maintained during the addition and for 15-30 minutes afterward. The reaction mixture was then poured onto 200 Gm cracked ice and allowed to stand for several hours before filtering off the 4' nitro 2 amino diphenyl sulphate. It was not possible to wash the sulphate owing to rapid hydrolysis so the wet salt was suspended in water and the free base liberated by an excess of 10% NaOH. The bright orange base was recrystallized from alcohol and melted at 158-159° C (corr). Further confirmation of the position of the substituents was obtained by preparing the acetyl derivative m p 201° C (corr) and transforming the amine to 2-bromo-4'-nitro diphenyl m p 81.5-82.5° C (corr). Scarborough and Waters state that 4'-m

tro 2-amino diphenyl has m. p.  $158^{\circ}\text{C}$  (corr) 4'-nitro 2 acetamido diphenyl m. p.  $199^{\circ}\text{C}$  (corr) and 2 bromo-4'-nitro diphenyl m. p.  $82.5^{\circ}\text{C}$  (corr)

(b) DIAZOTIZATION OF 2-AMINO-4'-NITRO DIPHENYL

18 Gm 2-amino-4'-nitro diphenyl were dissolved in the hot solution formed by adding 12 cc  $\text{H}_2\text{SO}_4$  to 120 cc of water. The solution was heated to  $90\text{--}95^{\circ}\text{C}$  and a solution of 5 Gm  $\text{NaNO}_2$  in 100 cc water slowly added with stirring. The stirring was assisted by blowing in steam. When the evolution of nitrogen ceased the acid liquor was decanted, and the tarry residue extracted with boiling 2%  $\text{NaOH}$ . After treating with decolorizing carbon the nitro phenol was precipitated by  $\text{HCl}$  and recrystallized from dilute alcohol. It formed white needles, m. p.  $123\text{--}124^{\circ}\text{C}$  readily soluble in alcohol, ether and benzene.

Nitrogen Found 6.2% Calc for  $\text{C}_{12}\text{H}_9\text{NO}_3$  6.5%

5-BROMO-2-HYDROXY-DIPHENYL

85 Gm 2-hydroxy diphenyl were dissolved in 100 cc  $\text{CS}_2$  or  $\text{CCl}_4$  and the solution cooled to  $0^{\circ}\text{C}$ . Partial crystallization occurred but this appeared to have no effect on the bromination; the crystals rapidly dissolving during the early stages of the reaction. To the well stirred cooled solution, a solution of 80 Gm bromine in 50 cc  $\text{CS}_2$  or  $\text{CCl}_4$  was added, the reaction temperature being maintained below  $5^{\circ}\text{C}$  by regulating the rate of addition. The solvent was then distilled off and the residue distilled under reduced pressure. B. p.  $158\text{--}160/4\text{ mm}$ . The distillate formed a thick colorless oil which would not crystallize even on long standing. Yield—90%.

Bromine Found 32.25% Calc for  $\text{C}_{12}\text{H}_9\text{OBr}$  32.13%

2-PHENYL-4-BROMO PHENOXY ACETIC-ACID

A solution of 5 Gm of 5-bromo-2-hydroxy diphenyl in 200 cc  $N\text{ NaOH}$  was boiled with 10 Gm chloroacetic acid until the solution was neutral to litmus. It was then acidified and the gummy product dissolved in  $\text{K}_2\text{CO}_3$  solution. After filtering the solution was acidified with dilute  $\text{H}_2\text{SO}_4$  and the precipitate recrystallized from alcohol.

M. p.  $138\text{--}139^{\circ}\text{C}$  Yield—nearly quantitative

C Found 53.1% Calcd for  $\text{C}_{14}\text{H}_{11}\text{O}_3\text{Br}$  54.7%

H Found 3.8% Calcd for  $\text{C}_{14}\text{H}_{11}\text{O}_3\text{Br}$  3.6%

ETHYL 2-PHENYL-4-BROMO PHENOXY ACETATE

24 Gm of the above phenoxy acetic acid were esterified by boiling with 100 cc absolute alcohol containing 4 Gm  $\text{HCl}$  gas for  $2\frac{1}{2}$  hours. The alcohol was then distilled off and the residual oil dissolved in ether and washed with  $\text{Na}_2\text{CO}_3$  solution and water. After drying over  $\text{CaCl}_2$  the ether was distilled off and the residue was analyzed without further purification, and mercurated.

C Found 56.8% Calcd for  $\text{C}_{16}\text{H}_{15}\text{O}_3\text{Br}$  57.3%

H Found 4.6% Calcd for  $\text{C}_{16}\text{H}_{15}\text{O}_3\text{Br}$  4.5%

2-PHENYL-4-BROMO-6-ACETOXY MERCURI PHENOXY-ACETIC ACID

13 Gm of the above ester were mercurated by the general method. The reaction mixture was then made strongly alkaline with  $\text{NaOH}$  and boiled to hydrolyze the ester. A heavy black precipitate which formed was filtered off and the filtrate acidified with acetic acid. The sticky precipitate was extracted with ether and the insoluble portion redissolved in  $\text{Na}_2\text{CO}_3$  filtered and reprecipitated. It formed a white sandy powder readily soluble in alkali and alkali carbonate solutions.

3,3'-DIPHENYL PHENOL-PHTHALEIN

10 Gm phthalic anhydride 36 Gm 2-hydroxy-diphenyl and 8 Gm conc  $\text{H}_2\text{SO}_4$  were heated for seven hours at  $140^{\circ}\text{C}$ . The purple melt was treated with water and boiled to remove any unreacted 2-hydroxy diphenyl. The granular brown powder remaining was then dissolved in  $\text{NaOH}$  filtered and reprecipitated with  $\text{HCl}$  and acetic acid. The precipitate was then dissolved in 100 cc of alcohol, decolorized with charcoal and the alcohol solution diluted with 600

ce of water A small tarry precipitate was filtered off and the phthalein obtained from the filtrate by boiling out the alcohol It formed a white fluffy powder M p 234-235° C An alkaline solution was violet red, the color change from violet to colorless occurring between  $p_H$  10.8-9.3

C Found 82.4 Calc for  $C_{22}H_{12}O_4$  81.7%

H Found 5.05 Calc for  $C_{22}H_{12}O_4$  4.7%

### 3,3'-DIPHENYL 5,5' DIBROMO-PHENOL-PHTHALEIN

9.4 Gm of the phthalein were suspended in 100 cc of alcohol and 6.4 Gm bromine added dropwise at 30-35° C with stirring The resulting red colored solution was allowed to stand for some time and then poured into 500 cc of water The precipitate was filtered off, washed and recrystallized from dilute alcohol m p 110-111° C Yield—quantitative An alkaline solution was deep blue with a slight red fluorescence by transmitted light  $p_H$  range, colorless at 8.4 to red at 10.0

Br Found 24.98% Calc for  $C_{22}H_{10}O_4Br_2$  25.48%

### 3,3' DINITRO 5,5' DIPHENYL-PHENOLPHTHALEIN

9.5 Gm 3,3' diphenyl-phenolphthalein were suspended in 100 cc glacial acetic acid and 3 cc  $HNO_3$  (sp gr 1.4) were added slowly with stirring After warming on the water-bath for a few minutes the product was precipitated by adding 500 cc water and recrystallized from alcohol Yield—80-90% Yellow needles, m p 135° C after some softening at 115° C

N Found 5.08-5.12% Calc for  $C_{22}H_{12}N_2O_6$  5.00%

### 3,3' DINITRO PHENOL PHTHALEIN

20 Gm of phenolphthalein were nitrated in exactly the same manner as the diphenyl phenolphthalein

Yellow needles from dilute alcohol m p 110-111° C

Yield—practically quantitative

N Found 6.59% Calc for  $C_{20}H_{12}N_2O_6$  6.78%

### SUMMARY

A number of mercury derivatives of 2- and 4-hydroxy-diphenyl were prepared and their bactericidal properties investigated The compounds mercurated were of two types, (a) in which a substituted hydroxy diphenyl was mercurated, (b) in which a phthalein prepared from hydroxy diphenyl was mercurated

The mercury compounds have been shown to have considerable bactericidal activity

### REFERENCES

- (1) White, *J A C S*, 42 (1920), 2355
- (2) Greenbaum *Am J Pharm* 102 (1930), 535
- (3) Whitmore *Org Compounds of Mercury*, Chemical Catalog Co N Y (1921)
- (4) B Latschinon, 6 (1872), 195
- (5) Borsche, *Ann*, 312 (1900), 226
- (6) Scarborough and Waters *J C S*, 131 (1927), 95

RESEARCH DEPT OF THE CHEMICAL & PHARMACEUTICAL LABORATORIES,  
E R SQUIBB & SONS,  
BROOKLYN, N Y

---

*United States Production of Coal-Tar Intermediates* during 1932 totaled 218,143,000 pounds with sales of 96,960,000 pounds valued at \$17,259,000, according to a United States Tariff Commission report The 1931 output was 267,213,000 pounds with sales of 124,186 pounds valued at \$23,023,000



# A COMPARATIVE STUDY OF THE STABILITY OF EMULSIONS WITH VARIATION IN THE PROPORTION OF INGREDIENTS \*

BY LILLIAN MARY LANGEVIN

## DEFINITIONS OF TERMS

An emulsion is a system containing two liquids that are immiscible, or practically so, one of which is dispersed in the form of globules in the other (1) The continuous or external medium is termed the dispersion phase (or dispersing phase), and the dispersed globules are called the internal or dispersed phase (or disperse phase) (2)

In general, there are two kinds of emulsions, namely, those that occur naturally and those that are produced artificially Natural emulsions include animal emulsions and plant emulsions Artificial emulsions may be produced by mixing two immiscible liquids Theoretically, it should be possible to make two types of emulsions from any two given immiscible liquids Assuming that oil and water are the two given liquids, one emulsion should correspond to the "oil-in-water" (o/w) type and the other should correspond to the "water-in-oil" (w/o) type However, Clayton (3) states that if only *pure water* and *pure oil* are used only a single type of emulsion can be produced and that is a dilute oil-in-water (o/w) emulsion A second class of emulsions exists which includes concentrated and more complex emulsions of both the oil-in-water and the water-in-oil type The stability or permanence of this class depends upon the presence of a third substance called an emulsifying agent or emulsifier These concentrated and complex emulsions possess considerable commercial and industrial importance, while the dilute, simple emulsions of oil-in-water have very little practical significance

If two pure immiscible liquids are shaken together, both liquids are divided into globules and become intermixed Upon standing, the globules of the respective liquids unite and separation into two distinct layers occurs When a third substance, called an emulsifier, is included in a system consisting of oil and water it tends to stabilize the system, and to form a permanent emulsion An emulsifying agent that is more readily wetted by water than by oil will form an oil-in-water emulsion, one that is more readily wetted by oil, a water-in-oil emulsion (4) Many substances have been used as emulsifiers These include soaps, egg-yolk, acacia, tragacanth, Irish moss, proteins, carbon, clay and many other finely divided substances

## THEORIES OF EMULSIFICATION

The development of Colloidal Chemistry has given rise to several theories of emulsification Ostwald (5) in 1910, formulated the "Phase-Volume Theory" which was based upon the theory of piled spherical balls This theory is no longer generally accepted A second theory is known as the "viscosity theory" Early investigators recognized the fact that the viscosity of the external phase probably had some influence on the stability of emulsions (6) Clayton states that "the majority of investigators to-day accept the conclusion that *viscosity aids emulsifi*

---

\* An abstract of a thesis prepared under the direction of Professor J B Burt in partial fulfilment for the requirements of Master of Science Scientific Section A Ph A Toronto meeting 1933

cation solely by virtue of the hindrance offered to coalescence of the dispersed globules, and is not the cause of emulsification "

In 1917, Fischler (7) advocated the "hydration theory" of emulsions and emulsification. The "surface tension theory" was the forerunner of the "adsorption film theory" which is quite generally accepted to day. Bancroft (8) formulated the "adsorption film theory" in 1913. He conceived the idea that the protective film surrounding the dispersed phase was a *separate phase*, which was wetted on one side by the oil phase and on the other side by the water phase and which had different surface tensions on the two sides. The type of emulsion produced depends upon the relative surface tension at the interfaces. The side of the intervening film which has the greater surface tension tends to become concave and enclose the liquid on that side, and the other liquid of lower surface tension tends to become the outer phase, since the tendency in any system is to assume the most stable condition, which is that which exists when the least surface energy is expended.

#### HISTORY OF PHARMACEUTICAL EMULSIONS

Emulsions have been used medicinally for a very long period of time. H. Schelenz (9) says that Pliny described a drink made of almonds and honey that may have been the original almond emulsion. The earliest reference that he finds to the word emulsion is "de Emulsionibus" in Schroeder's Pharmacopœia of the seventeenth century. Oil emulsions were first described by Baumé.

The early pharmaceutical literature of the United States makes mention of emulsions. Thus early literature from about 1830 up until about 1865 was concerned largely with the publication of formulas for the production of emulsions.

During the forty-year period from about 1860 to 1900 investigations were made relative to methods of emulsification, to the kind of emulsifier, and to the proportions of ingredients which should be used in emulsions. The "bottle method," the "English method" and the "Continental method" of emulsification were advocated. Many different emulsifying agents were proposed. There appears to have been a great diversity of opinion regarding the proportion of ingredients to be used in emulsions.

Pharmaceutical literature indicates that emulsions were first produced upon a large scale for commercial distribution about 1900.

#### EXPERIMENTAL STUDY AND RESULTS

The object of this experiment was twofold, *first*, to determine the effect of dilution upon the stability of emulsions of oils of animal and vegetable origin which are used pharmaceutically, and, *second*, to determine the limits of emulsification or emulsibility of these oils when variation in proportion of ingredients occurred, and incidentally, to determine whether or not the proportions of ingredients, which are recommended by the present United States Pharmacopœia and National Formulary for the preparation of emulsions of fixed oils, are optimum.

It should be said, in the beginning, that this problem was approached from the practical standpoint. An attempt was made to simulate the conditions which occur in the average drug store. The materials and apparatus used were, for the most part, similar to those found in drug stores, and the manipulation was as

uniform as possible. The acacia was weighed on a torsion balance and the water and oils were measured in cylindrical or conical graduates. These measurements were made in this manner so that the conditions of the experiment might be duplicated in the average drug store where, it is hoped, this work may prove to be of some practical value.

The materials used were purchased on the open market in quantities sufficient to run the entire series of experiments so as to insure uniformity of ingredients. The oils included expressed oil of almond, castor oil, cod liver oil, cottonseed oil, raw linseed oil, olive oil and sesame oil. Acacia was chosen as the emulsifying agent since it is most commonly used. The specific gravities of the oils were checked using both the pycnometer and the Mohr-Westphal balance. Relative or specific viscosity was determined, the Saybolt viscosimeter being used. These physical constants appear in Table I.

In studying the effect of dilution upon pharmaceutical emulsions, large quantities of primary emulsions were prepared. Enough primary emulsion was made to supply the base for a single series of dilutions, separate primary emulsions were prepared for each series. Duplicate series of each oil were run, the Continental or 1-2-4 (A-W-O) method of emulsification was used. Twelve hundred cc of a given oil which contained 0.5% of dissolved thymol (this was used as a preservative) were thoroughly mixed with 300 Gm of acacia in a large wedgewood mortar, then 600 cc of water were dashed in at once, and the mixture triturated until a thick, viscous, homogeneous, creamy emulsion resulted.

Dilutions of these primary emulsions were made. In order to not lose any of the primary emulsion by pouring from one container to another, the required amount of primary emulsion was measured directly into graduated 8 ounce prescription bottles. The required amount of emulsion was determined in the following manner. For example, it was necessary to make a dilution of primary emulsion of cod liver oil, which when finished would contain 10 per cent of oil. The factor used in determining the quantity of primary emulsion necessary in any given dilution was determined in the following way. One hundred cc of oil were thoroughly mixed with 25 Gm of acacia in a graduated 240 cc bottle. Then 50 cc of water were added and the mixture was shaken until emulsification or at least uniform mixing occurred. The mixture was allowed to settle until air bubbles had escaped and then the quantity of emulsion measured. In the case of cod liver oil, 100 cc of oil produced 168.75 cc of emulsion. The resulting factor was  $168.75/100$  or 1.6875 in this case. Then if a 10 per cent emulsion of cod liver oil was required, 24 cc of oil would be required. The amount of primary emulsion corresponding to this would be 24 times the factor 1.6875 or 40.50 cc. The primary emulsion was poured into the graduated bottle up to the indicated mark. Dilution was made by adding the required water in 5 cc portions, thorough mixing occurred after each addition. The finished emulsions were stored at room temperature.

These dilute emulsions were examined daily over a period of 30 days for signs of cracking, decomposition and other changes that might occur. (By cracking is meant the complete separation of the mixture into two distinct layers, an oil layer and a water layer.) There were no cases of cracked emulsions. However, emulsions which contained 30 per cent or less of oil, usually showed a separation in the form of a supernatant, creamy layer which was readily reincorporated by

shaking The number of cubic centimeters in this creamy layer was measured daily This was done by measuring the liquid upon the side of the graduated bottle Then, the emulsions were thoroughly shaken up and allowed to stand until the following day At the end of the 30 day period, the average number of cubic centimeters of separation was calculated and converted into percentage

Decomposition occurred in the castor oil emulsions which developed rancidity after about the fourth day Considerable gas was evolved and in several cases sufficient pressure was developed to force the corks from the bottles A decided odor of butyric acid was present In emulsions ranging from 25 to 40 per cent a dark lumpy-looking layer formed at the bottom of the bottle This was probably due to decomposition products

Some of the cottonseed oil emulsions, while apparently not rancid, developed a "slimy," "buttery" appearance in the supernatant layer and toward the end of the period it was impossible to mix this layer with the rest of the mixture

The more dilute emulsions of expressed oil of almond showed a double layer, the upper one having a very oily appearance

Several emulsions in the various series showed a tendency to form lumps which could be shaken out easily

After the 30-day period, the specific viscosity of these emulsions was determined so far as it was possible to run them through the viscosimeter These values may be found in Table II

Table III indicates the percentage of separation of these emulsions

An effort was made to determine the limits of emulsibility of these seven oils when varying proportions of ingredients were used The order of mixing used was that of the Continental method Starting with the 1 2 4 proportion, three series of emulsions were made, varying acacia, water and oil, respectively In each case, the variation amounted to a progressive increase or decrease equal to 20 per cent of the original proportion of the variable ingredient For example, in a series in which water was varied, the proportions were 1 4 4, 1 (3 6) 4, 1 (3 2) 4, 1 (2 8) 4, 1 (2 4) 4, 1 2 4, 1 (1 6) 4, 1 (1 2) 4, 1 (0 8) 4, 1 (0 4) 4 Small portions of these emulsions were prepared, averaging about 20 cc -25 cc of finished emulsion The smallest amount of liquid used was never less than 5 cc When an emulsion resulted at the first trial it was not repeated When emulsions failed at the first attempt, three or more trials were made, unless it was obvious that an emulsion could not be formed, as for example, when so great a bulk of acacia was present that the system could not be manipulated

It was found that emulsibility was not limited to any given proportion of ingredients, but rather that it was possible to produce an excellent grade of emulsions over a small range, and emulsions of decreasing quality with increasing variation in proportions of ingredients beyond that range

Since emulsions were produced over a considerable range and the limit of emulsibility was not sharp, the diameter of the oil globules in the various emulsions was determined microscopically, in the effort to see if they might give a numerical criterion of quality

The procedure was as follows A graduated eyepiece was calibrated to read in microns High power was used for the determinations Three slides were made from each emulsion, similar to the way in which smears are made in bac-

teriology The diameters of ten oil globules from each slide were recorded, those globules which touched the 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5 and 5.0 marks on the scale were arbitrarily selected The average diameters are listed in Tables IV, V and VI

Table IV which shows the changes in proportion of acacia tends to show that an increase in acacia is accompanied by a reduction in the size of oil globules An increase in the proportion of acacia is limited by the thickness developed in the mixtures containing high proportions of acacia, rendering the manipulation of the system impossible A decrease in acacia beyond about 1.0 part or 0.8 part tends to cause a rapid increase in globule size and lack of emulsibility

When the proportion of water was varied an increase in water resulted in an increase in the size of the oil globules If less than 1.6 parts of water were used the mixture was a thick gummy mass, in most cases almost doughy Upon the addition of more water, a fairly good emulsion generally resulted Greater quantities than about 2.5 parts of water resulted in emulsions which creamed rapidly (Table V)

Emulsions made with variations in the proportions of oil showed that the most stable emulsions resulted when from 2.0 to 4.0 parts of oil were used (Table VI)

TABLE I—SHOWING SPECIFIC GRAVITY AND RELATIVE VISCOSITY OF THE OILS USED IN PREPARING EMULSIONS

Oil	Sp. Gr. (25° C)	Relative Viscosity (25° C)
Expressed oil of almond	0.9131	16.84
Castor oil	0.9592	104.04
Cod liver oil	0.9210	8.35
Cottonseed oil	0.9199	16.89
Raw linseed oil	0.9266	12.21
Olive oil	0.9115	11.37
Sesame oil	0.9196	10.53

TABLE II—SHOWING SPECIFIC VISCOSITY OF EMULSIONS AT THE END OF THE 30 DAY PERIOD

% of Oil	Expressed Oil of Almond	Castor Oil	Cod Liver Oil	Cottonseed Oil
5	1.11	1.14	1.30	d
10	1.22	1.17	1.40	d
15	1.34	d	1.67	1.46
20	1.61	1.49	2.03	1.92
25	1.93	2.16	3.02	2.65
30	2.90	3.37	4.81	4.23
35	5.98	5.54		
% of Oil	Raw Linseed Oil	Olive Oil	Sesame Oil	
5	1.07	1.25	1.15	
10	1.17	1.40	1.28	
15	1.38	1.57	1.51	
20	1.82	2.14	1.92	
25	2.53	3.21	2.91	
30	4.23	5.05	4.27	
35				

d signifies decomposition or rancidity

TABLE III—SHOWING THE AVERAGE PERCENTAGE OF SEPARATION IN EMULSIONS OF VARYING OIL PERCENTAGE

Oil	Series	% of Oil in the Finished Emulsion				
		5%	10%	15%	20%	25%
Expressed oil of almond	A	10 46	15 46	21 29	26 50	31 83
	B	10 71	15 96	21 14	27 31	30 54
Castor oil	A	10 86	15 33	21 54	26 92	31 38
	B	10 68	15 44	20 92	23 35	*
Cod liver oil	A	12 42	15 46	20 04	18 13	*
	B	11 63	14 48	16 79	16 54	*
Cottonseed oil	A	10 72	17 46	22 51	26 21	25 54
	B	12 03	17 63	22 53	24 13	*
Linseed oil	A	10 33	13 38	16 79	17 42	15 95
	B	12 63	14 01	17 04	17 46	17 04
Olive oil	A	10 82	17 23	20 63	23 88	*
	B	10 83	17 43	20 75	24 89	*
Sesame oil	A	10 92	16 83	22 99	30 43	35 54
	B	10 71	16 58	22 67	28 71	*

Oil	Series	% of Oil in the Finished Emulsion				
		30%	35%	40%	45%	50%
Expressed oil of almond	A	36 77	43 46	59 04	81 00	*
	B	37 88	47 42	59 13	87 46	*
Castor oil	A	*	*	*	*	*
	B	*	*	*	*	*
Cod liver oil	A	*	*	*	*	*
	B	*	*	*	*	*
Cottonseed oil	A	*	*	*	*	*
	B	*	*	*	*	*
Linseed oil	A	18 29	*	*	*	*
	B	31 21	*	*	*	*
Olive oil	A	*	*	*	*	*
	B	*	*	*	*	*
Sesame oil	A	*	*	*	*	*
	B	*	*	*	*	*

\* No separation occurred within the 30 day period

TABLE IV—SHOWING THE AVERAGE DIAMETER IN MICRONS OF OIL GLOBULES IN EMULSIONS WHICH HAVE VARYING PROPORTIONS OF ACACIA

Prop of Acacia	Expressed Oil of Almond	Castor Oil	Cod Liver Oil	Cottonseed Oil
2 0	**	3 0	2 4	4 2
1 8	3 8	2 6	4 1	3 3
1 6	3 5	2 5	3 2	3 4
1 4	4 7	3 7	4 6	3 5
1 2	4 1	2 6	5 8	4 3
1 0	5 0	4 2	4 4	3 4
0 8	5 5	5 2	6 0	5 7
0 6	8 1	6 5	10 3	7 9
0 4	10 6	**	**	8 0

Prop of Acacia	Raw Linseed Oil	Olive Oil	Sesame Oil
2 0	4 8	4 4	**
1 8	5 6	3 8	4 6
1 6	5 4	3 9	5 2
1 4	4 7	4 9	5 2

1 2	6 3	4 1	5 4
1 0	6 2	3 6	2 9
0 8	5 5	5 7	5 8
0 6	11 6	14 8	7 9
0 4	14 8	14 7	22 7

\*\* No emulsification obtained

TABLE V—SHOWING THE AVERAGE DIAMETER IN MICRONS OF OIL GLOBULES IN EMULSIONS WHICH HAVE VARYING PROPORTIONS OF WATER

Prop of Water	Expressed Oil of Almond	Castor Oil	Cod Liver Oil	Cottonseed Oil
4 0	**	**	17 9	16 6
3 6	10 0	15 2	17 3	12 0
3 2	9 5	14 9	12 3	8 6
2 8	10 4	8 3	8 6	6 0
2 4	6 3	4 8	6 5	4 6
2 0	5 0	4 2	4 4	3 4
1 6	5 4	3 5	4 2	3 8
1 2	**	**	**	**
Prop of Water	Raw Linseed Oil	Olive Oil	Sesame Oil	
4 0	**	**	**	
3 6	8 8	19 2	18 1	
3 2	8 7	11 8	9 2	
2 8	7 2	7 4	5 4	
2 4	5 7	4 5	6 5	
2 0	6 2	3 6	2 9	
1 6	7 9	3 0	3 9	
1 2	**	**	**	

\*\* No emulsification obtained

TABLE VI—SHOWING THE AVERAGE DIAMETER IN MICRONS OF OIL GLOBULES IN EMULSIONS WHICH HAVE VARYING PROPORTIONS OF OIL

Prop of Oil	Expressed Oil of Almond	Castor Oil	Cod Liver Oil	Cottonseed Oil
6 4	**	5 0	**	**
5 6	5 8	4 6	**	4 5
4 8	5 5	4 2	4 8	4 9
4 0	5 0	4 2	4 4	3 4
3 2	4 1	3 1	3 2	4 0
2 4	5 0	3 9	3 7	4 2
1 6	6 4	4 5	4 6	4 9
0 8	11 3	6 6	10 0	9 9
Prop of Oil	Raw Linseed Oil	Olive Oil	Sesame Oil	
6 4	**	**	**	
5 6	7 4	5 0	**	
4 8	5 5	5 9	7 1	
4 0	6 2	3 6	2 9	
3 2	4 6	4 1	4 7	
2 4	4 8	4 3	4 6	
1 6	4 4	5 9	7 4	
0 8	6 0	8 1	10 0	

\*\* No emulsification obtained

## SUMMARY AND CONCLUSIONS

1 Dilutions of primary emulsions of expressed oil of almond, castor oil, cod liver oil, cottonseed oil, raw linseed oil, olive oil and sesame oil were prepared so that the finished emulsions contained oil percentages varying from 5 to 55 per cent. In no case, did cracking or breaking of the emulsion occur. "Creaming" occurred in emulsions containing 30 per cent or more of oil, but this cream layer was readily reincorporated by agitation.

2 A change in the variation of proportion of ingredients in emulsions of the oils named above resulted in the following conclusions:

(a) An increase in the proportion of acacia is accompanied by a decrease in the size of the oil globules and vice versa.

(b) An increase in the proportion of water results in an increase in the size of dispersed oil globules.

(c) Emulsions containing from 20 to 40 parts of oil had the smallest oil globules.

(d) It appears probable that the smaller the range in variation of size of oil globules the more stable the emulsion.

(e) Emulsions of fixed oils may be prepared with a much wider range in variation in proportion of ingredients than the 1:2:4 rule would indicate. The results of this experiment showed that emulsions made according to the 1:2:4 rule were not always optimum, however, satisfactory emulsions of fixed oils should result when these proportions of ingredients are used.

## BIBLIOGRAPHY

- (1) W. Clayton, "Theory of Emulsions," 2nd Edition (1928), page 1.
- (2) Kruyt and von Klooster, "Colloids," 2nd Edition (1930), page 7.
- (3) W. Clayton, "Theory," page 2.
- (4) *Ibid*, page 25.
- (5) *Kolloid-Z*, 6 (1910), 103, 7 (1910) 64, through Clayton, "Theory," page 45.
- (6) W. Clayton, "Colloidal Aspects of Food Chemistry and Technology" (1932), page 165.
- (7) Fischer and Hooker, "Fats and Fatty Degeneration" (N. Y. 1917), page 5, through Clayton, "Theory," page 60.
- (8) *J. Phys. Chem.*, 17 (1913) 514-518, through Clayton, "Theory," page 120.
- (9) YEAR BOOK, A. P. H. A., Vol. 10 (1921) 81, *Schweiz. Apoth.-Ztg.*, 59 (1921), 657.

COLLEGE OF PHARMACY,  
UNIVERSITY OF NEBRASKA  
LINCOLN, NEBRASKA

## DECEPTIVE LITERATURE OF 50 YEARS AGO

*The Chemist and Druggist* of April 14, 1883, contains this paragraph—Seldom has a richer specimen of our omniscient journalism been printed than this choice sentence: "It has been stated recently that in the manufacture of soda water, marble dust and oil of vitriol are largely used, and although there may be exaggeration in this, as there generally is in assertions of a wholesale character, still the imputation is one which the great brewers should be anxious to refute, as indeed they did successfully refute the charge of using aconite instead of hops in the manufacture of bitter beer." This is not so very different from recent literature: "Let it be the ardent desire of every pharmacist that pharmacy and pharmacists will maintain their dignity and professional standards."



## THE EXTRACTION AND ASSAY OF CRUDE ERGOT \*

BY MARVIN R THOMPSON (1) (*Continued from page 1141 November 1932*)

## EXTRACTION BY PROCESS OF U S P X

The studies herein described were designed to shed light upon serious discrepancies in results obtained in the assay of crude ergot by experienced workers, which have from time to time come to the writer's attention. Also, to reveal, if possible, the cause of the all too frequent inability of pharmaceutical manufacturers to obtain an amount of standardized Fluidextract of Ergot in agreement with the previous assay of a small sample of the crude ergot involved. The fact that the yield of standardized product on different occasions has been observed to exceed as well as fall short of the amount predicted by previous assay of the particular crude drug involved, would at first cause one to suspect the accuracy of the assay method as the main cause of discrepancies. On a number of occasions, however, extremely critical check assays by all three of the most accurate of known methods (Rabbit Uterus, Colorimetric and Cock's Comb) left no doubt but that some discrepancies were of a magnitude greater than could possibly be accounted for by experimental error in the assays. Since the present U S P requires the conversion of crude ergot into a Fluidextract of Ergot by a specified Type Process "B" for the assay, it appeared distinctly possible that the observed discrepancies might be accounted for by a difference in efficiency between "commercial scale" and "laboratory scale" preparation of the Fluidextract. A critical study of the official Type Process "B" was, therefore, undertaken.

The study yielding the results herein reported was conducted upon twelve different lots of crude ergot, although experience with ergot during five years has provided many more observations intimately related to this problem. Six of the lots selected were of poor to fair quality, while the other six were of good quality. These six lots were converted to fluidextracts by the official type process "B" of the U S P, and the "reserve" as well as the "exhaust" percolates were subjected to critical assay for alkaloidal activity by the Rabbit Uterus method according to the technique described in the preceding article of this series. After assay of the "reserve" and "exhaust" percolates, the "exhaust" percolates were concentrated as directed by the U S P and incorporated in the "reserve" portion, adjusting the volume to 100 cc (from 100 Gm of drug) in all cases. These finished products were then likewise assayed. Ergotoxine Ethanesulphonate was used as the standard in these assays.

It is important to note that all six lots were subjected as closely as possible to the same type of treatment, *i e*, all lots were reduced to powders of equal fineness, percolators of the same size and shape were used, percolation was carried on very slowly and at identical rates for all, the same moderate temperature was applied to all during concentration of "exhaust" percolates, etc.

## TESTS FOR EXHAUSTION OF THE DRUG

These chemical tests have been developed in order to avoid the necessity of routinely testing for exhaustion by physiological methods. Their sensitivity and

---

\* Scientific Section A Ph A Toronto meeting 1932

reliability have been carefully checked physiologically and approved for the intended practical purpose for which they were designed

Perecolation was in all cases carried to the same degree of exhaustion. Absence of color in the percolates was utilized merely as a rough criterion as to completeness of extraction. The following two chemical tests were used routinely in every case for proving exhaustion, as follows (These tests were not ordinarily applied until percolate was nearly colorless)

Test (a) Approximately 4 cc of the issuing percolate is diluted threefold with a saturated aqueous solution of sodium bicarbonate. Failure to develop precipitate, turbidity or faint opalescence during one hour shows that extraction is sufficiently complete for practical purposes

Test (b) This test is somewhat less sensitive than (a). Approximately 4 cc of the issuing percolate is diluted twofold with water and made slightly but distinctly alkaline to litmus by the cautious addition of 1% ammonia water. Failure to develop precipitate, turbidity or faint opalescence during one hour shows that increasing the volume of the percolate by further extraction would not be justifiable

These tests are also reliable and serviceable in the event tests are desired upon percolates containing some color, i. e., before the color has disappeared from the percolate. If color is present, no other indicator is necessary in applying test (b), since this color changes upon being made faintly alkaline

The results obtained in the extraction experiments are recorded in the following Table I

TABLE I

The proportions of ergot alkaloidal activity appearing in the "Reserve Portion" the "Exhaust Percolate" and also comparing the alkaloidal activity of the Type Process "B" Fluid-extract with that of a straight quantitative percolate. All assays by the Epinephrine Inhibition method. Alkaloidal content expressed in terms of Ergotoxine Ethanesulphonate \* 100 Gm samples of crude ergot used in each case

Crude Drug	Amt of Alkaloid Present in the 85 Cc Reserve Portion		Additional Vol of Percolate Obtained to Exhaust the Drug Cc	Amt of Alkaloid Present in the Total Exhaust Percolate		Total Amt of Alkaloid Present in Drug (Calculated) Reserve plus Exhaust	Total Alkaloid in 100 Cc F E by Type Process B	Per Cent Total Alkaloid Lost by Concentration of Exhaust Percolate of Type Process B (Approx)
	Mg	Per Cent of Total Alkaloid Present in Drug (Approx)		Mg	Per Cent of Total Alkaloid Present in Drug			
1	33 2	55	415	27 2	45	60 4	46 5	23%
2	13 77	43	465	18 03	57	31 8	20 2	36%
3	50 97	58	515	37 23	42	88 2	62 7	28%
4	135 8	63	515	79 4	37	215 2	170 2	20%
5	92 02	52	565	85 98	48	178 0	108 5	39%
6	117 8	60	465	78 2	40	196 0	133 0	32%

\* Generously supplied by Dr C S Leonard, Burroughs Wellcome & Co

## DISCUSSION OF TABLE I

The results tabulated above are uniformly significant in showing that, in spite of most careful attention to details shown by experience to influence efficiency in extraction of drugs the "reserve portion" cannot be expected to contain significantly more than one half of the total activity of the drug, thus essentially confirming the experiments of Wokes and Elpbick (2). It logically follows, therefore, that the remainder of the activity must be contained in the "exhaust percolate" which the results show, attains a considerable volume before extraction is reasonably complete. From the standpoint of accurate bioassays of crude ergot and also from the standpoint of commercial extraction of ergot, it is highly significant that concentrating the exhaust percolate for incorporation into the reserve portion results in a loss of activity that is great and

likewise considerably variable. Other experiments conducted in this laboratory have shown that the employment of partial vacuum in the concentration of the exhaust percolate does not avoid the loss of considerable activity. Similarly, the use of a hot air blast to affect the concentration was found to be attended by a loss of considerable activity. The writer has been unable to find any practical method of concentrating such hydro alcoholic ergot percolates which could be carried out without the danger of losing an objectionable amount of the activity.

The above results make it readily apparent that the procedure at present specified by the U S P for the assay of crude ergot cannot possibly reflect the true potency of the drug even though the methods of testing the resulting fluidextract were 100 per cent accurate. Because of the loss of activity incurred in the procedure of concentrating the large volume of 'exhaust' percolate, the most accurate assay possible must necessarily reveal a potency approximately 20 to 30% lower than was actually present or extractable from the drug. It is important to point out that the loss so incurred cannot be assumed to be even reasonably constant for a number of reasons. Different samples of ergot vary greatly with respect to ease of extraction, some being well extracted by a 1 to 4 percolate while others require percolation to the extent of 1 to 10. Aside from the natural variations in ergot such factors as size and uniformity of particles of the ground drug, completeness of defatting, height of the column of drug in the percolator, amount of packing of drug, temperature during entire extraction procedure, time of maceration and rate of percolation are vitally concerned in extraction efficiency. Since certain of these factors cannot be precisely controlled, it is obvious that considerable variation in extraction efficiency as well as in concentration technique would occur from laboratory to laboratory, due in part to the personal equation of the operator. Consequently the proportions of activity obtained, respectively, in the 'reserve' and 'exhaust' percolates are subject to considerable variation. Generally speaking the greater the proportion of activity contained in the 'exhaust' percolate to be concentrated for incorporation into the 'reserve' portion the greater is the loss of activity sustained. The converse is also true; i. e. the greater the proportion of the total activity contained in the 'reserve' portion, the less will be the loss sustained by concentration of the 'exhaust' percolate.

It will be apparent from the above that it is virtually impossible, at least extremely improbable for two or more different workers to obtain fluidextracts of identical potency from different portions of the same lot of ergot using the Type Process 'B' specified by U S P X. Even assuming that the several workers would attain absolute accuracy in assaying their respective fluidextracts the results would necessarily be variable and in all cases show a potency considerably lower than that actually present in the drug under examination.

The failure of the procedure specified by the present U S P to provide for the appearance of the total amount of activity of the drug in the liquid to be subjected to assay, was responsible for an investigation of other possible extraction procedures with the hope of developing one which would be more dependable in providing for the appearance, in the liquid extract, of the total amount of activity contained in the crude drug thereby eliminating at least this serious source of error in assaying crude ergot.

The results of Table I suggested a fairly obvious course to follow for affecting such a dependable quantitative extraction of the sample to be assayed. Since the observed variable loss in activity was sustained only in the concentration of the 'exhaust' percolate, it seemed certain that the direct assay of the total unconcentrated quantitative percolate would yield a true estimate of the activity contained in the crude drug. In carrying out such a simple quantitative percolation, it is obviously advantageous to obtain the total activity of the drug in as small a volume of percolate as possible and at the same time, if possible to have the nature of this quantitative percolate such that it would lend itself to direct assay without the necessity of subjecting it to chemical procedure prior to such assay.

Experience has shown that a menstruum consisting of approximately equal parts of alcohol and water is the most satisfactory for insuring an efficient extraction of ergot and at the same time providing for a percolate which could be assayed directly without further manipulation. It is now generally agreed that the extraction efficiency is enhanced somewhat by the addition of a small amount of acid to this menstruum. In an earlier series of communications (10) the writer emphasized the importance of the use of hydrochloric acid in the menstruum partly because of a moderately favorable influence upon extraction efficiency but mostly because of the

well known work of Swanson which definitely showed that an appreciably acid  $pH$  favored the stability of the finished fluidextract. Further reference to  $pH$  and stability will be discussed later.

The fact that such straight quantitative percolates attain great volumes, causing the alkaloidal concentration of the usual run of samples to fall in the low range of 0.005 to 0.05 per cent in terms of ergotamine bars the accurate use of the official Cock's Comb method or any of its modifications. The Isolated Rabbit Uterus method, as described in the preceding communication, provides ample sensitivity for this purpose and was consequently the method of choice. Greatly excessive acidity in the test percolate is highly objectionable in the application of this method, as will be shown in a later report from this laboratory. Since added acidity exerts only a moderate influence on extraction efficiency and since the stability of the percolate is not a disturbing factor in this assay procedure, there is no reason for employing excessive amounts of acid in the menstruum.

A considerable number of experiments has led to preference for the following procedure as a method for the assay of crude ergot—definitely more reliable than the method at present specified by U S P X.

#### METHOD

(a) *Assay Sample*—It is extremely important to use all possible care in securing an assay sample that is representative of the lot in question. Crude ergot is invariably imported or shipped in bags. The potency shown by samples from different bags of the same shipment, or even samples taken from different parts of the same bag, has been found on a number of occasions to vary considerably. The writer is convinced that it is not advisable to conduct an assay upon a representative sample weighing less than 50 Gm., while the extraction of a 100 Gm. sample is preferable.

(b) *Extraction Procedure*—The drug is ground in the usual manner and sifted in a No. 30 sieve, returning portions remaining in the sieve to the mill, until all has passed through. The powder is then thoroughly mixed and the accurately weighed assay portion of the powder is transferred without packing to a properly prepared glass percolator. The percolator should be of such a size and shape that the column of drug attains a height of at least five times the average diameter of the percolator while at the same time leaving space for menstruum above the drug. Within reasonable limits, the higher the column of drug the greater is the extraction efficiency. The powder is then defatted as directed in U S P X, and finally freed from the benzene. The defatted powder is then moistened with a sufficient quantity of a menstruum consisting of 2 per cent by volume of Hydrochloric Acid, U S P, in diluted alcohol (equal parts by volume of alcohol and water) to render it evenly and distinctly damp. It is then again transferred to the percolator, lightly shaken down but not packed. More of the same acidified menstruum is added, maintaining a layer of liquid above the drug until the liquid reaches the lower orifice. The outlet is then closed and the whole allowed to stand for 12 hours or over night. After this maceration period, percolation is allowed to proceed at a very slow rate using diluted alcohol as menstruum until the color is practically absent from the issuing percolate and the issuing percolate proves negative to the 'Tests for Exhaustion' given above.

The volume of percolate obtained is then noted and the liquid is assayed by the Isolated Rabbit Uterus method, expressing the potency of the drug, after appropriate calculation, in terms of a suitable standard.

If it is preferred the percolate likewise lends itself to assay by the Smith Colorimetric method or any of its several modifications.

As previously stated the low concentration of alkaloidal activity in such quantitative percolates precludes the possibility of applying the official Cock's Comb method with any acceptable degree of accuracy.

The following Table II shows very clearly that a fluidextract prepared by Type Process B' does not contain the full amount of activity actually contained in the drug sample, confirming the results of Table I. This table also shows the greater assay accuracy provided by the extraction method described above.

In explanation of Table II, it should be pointed out that the six samples of crude ergot involved were the same samples under examination in Table I. The identification numbers of the drug samples correspond in the two tables. The results shown in Table II are self-explanatory.

TABLE II—THE POTENCY OF CRUDE ERGOT ASSAYED AS THE U S P X FLUIDEXTRACT, AS COMPARED TO THE POTENCY REVEALED WHEN A 'QUANTITATIVE PERCOLATE'\*\*\* IS ASSAYED

Crude Drug No	Total Alkaloid* from 100 Gm Drug after Conversion to U S P X Fluidextract Mg	Total Alkaloid* in Quantitative Percolate ** from 100 Gm Drug Mg	Vol of Quantitative Percolate from 100-Gm Drug Cc
1	46 5	64 7	650
2	20 2	34 1	650
3	62 7	89 7	650
4	170 2	209 3	900
5	108 5	175 5	700
6	133 0	203 3	750

\* In terms of Ergotoxine Ethanesulphonate

\*\* Prepared by the process just described

tory A source of serious error in the present U S P X procedure for assaying crude ergot is clearly revealed By adding the possible error caused by the present official extraction procedure to the possible error inherent with available assay methods the discrepancies encountered in the assay of crude ergot by the same or different workers are readily accounted for The first source of error can be eliminated in a very practical manner by employing the simple extraction technique just described A further advantage over the U S P X procedure lies in the fact that the concentration of exhaust percolate is eliminated, thereby saving time and expense

The quantitative percolate obtained by the above procedure does not of course constitute an acceptable therapeutic ergot preparation The potency represents that of a tincture rather than a fluidextract, and this would necessitate a prohibitively large therapeutic dose A more efficient method of preparing a 1:1 fluidextract than is provided by the U S P X requirements would obviously be desirable from the manufacturer's standpoint for economic reasons alone A consideration of this problem follows

#### AN IMPROVED METHOD FOR PREPARING FLUIDEXTRACT OF ERGOT U S P

The preceding experiments clearly show that the active principles of ergot are partially destroyed by the moderate heat necessary for concentration of the "exhaust" percolate in the Type Process B' at present specified by the U S P It is obvious, therefore, that a method of preparation not involving the use of heat would avoid the loss of activity sustained in carrying out the present official method

The Fractional' or Divided Percolation' method, designated as Type Process C, of the U S P X, page 160 is recommended for drugs containing constituents which are injured by heat This entire procedure is carried out at room temperature no concentration of weak percolates being necessary

A series of experiments were undertaken to determine the relative applicability of Type Process 'C' as compared to Type Process B The same single menstruum was used throughout for each process and consisted of 1% of U S P Hydrochloric Acid in diluted alcohol (equal vols of water and alcohol) This amount of acid was chosen because of experiments showing that higher concentrations of acid did not significantly increase the efficiency of extraction In ascertaining the relative efficiency and applicability of the two processes the use of the same menstruum in each case was obviously imperative For those who believe that higher acidity increases the stability of the finished product, the  $p_H$  may be adjusted to the desired level by the direct addition of the acid to the mixed percolates This particular point requires much clarification and will be dealt with later by a presentation of experimental evidence on the influence of  $p_H$  upon stability of the fluidextract A brief discussion of the practical aspects of the adjustment of  $p_H$  is however, necessitated by a recent publication by Wokes and Elphick (11) in which reference was made to an earlier communication by the present writer (12) This discussion follows Table III

The results in Table III show conclusively that Fluidextracts of Ergot prepared by Type Process 'C' are invariably superior from the standpoint of potency to those prepared by the present official process A slight difference in  $p_H$  in the products yielded by the two processes is probably caused by a loss of hydrochloric acid during the concentration of the exhaust percolate involved in Type Process B'

TABLE III—TYPE PROCESS 'B' COMPARED AS TO POTENCY AND  $p_{H}$  WITH TYPE PROCESS "C," FOR THE MANUFACTURE OF FLUIDEXTRACT OF ERGOT 100 GM PORTIONS OF DRUG USED IN ALL CASES VOLUME OF EACH FINISHED FLUIDEXTRACT WAS 100 CC

Drug	Alkaloid Content of Finished F Type Process B		F Prepared by Type Process C		Potency Gained through Use of Type Process C
	Mg /Cc	$p_{H}$	Mg /Cc	$p_{H}$	Mg /Cc
7	0 27	4 67	0 37	4 54	0 10
8	0 46	5 18	0 61	4 97	0 15
9	1 00	5 36	1 44	5 17	0 44
10	0 93	4 88	1 27	4 55	0 34
11	0 75	4 87	0 98	4 66	0 23
12	0 57	5 31	0 71	5 12	0 14

In terms of Ergotoxine Ethanesulphonate

In addition to such results obtained on a laboratory scale, the writer has been privileged to introduce Type Process "C" and observe similar comparisons in the preparation of Fluidextract of Ergot on a commercial manufacturing scale. Assays were run on the crude ergot involved in each case the 'reserve' and 'exhaust' percolates and finished product of Type Process B were tested, and in the case of Type Process "C," all three percolates as well as the finished product were assayed. In these observations, the greater efficiency of Type Process "C" was clearly evident in every case. Experience thus gained has brought out several points of particular interest to pharmaceutical manufacturers with reference to Type Process "C." In applying this process on either laboratory or commercial scale production, these studies have shown that the proportions of activity contained, respectively, in the three percolates are subject to considerable variation. Such variations appear to be due, *first*, to a natural difference in ease of extraction of different lots of ergot; *second*, to differences in construction details of extraction equipment, and *third*, to personal equation of the operator particularly with respect to the rate of percolation. Such variations are, however, of little importance in practice, since the final product consisting of the mixed percolates will necessarily contain the total activity extracted. All observations show Type Process "C" to be from 20 to 40% more efficient than Type Process "B" for the manufacture of Fluidextract of Ergot.

In manufacturing Fluidextract of Ergot by this process, it is highly advantageous to know accurately the potency of the lot of drug involved. Only with such knowledge can one avoid the danger of obtaining a product sub standard as to potency. Attempts at concentration result in a loss of activity which is unnecessary under proper control. In adjusting the potency of the finished product, reduction of potency should never be accomplished by the simple addition of menstruum. The potency should be reduced in such cases by continued percolation until the mixed percolates show the required potency, or until exhaustion is complete as indicated by the tests given above. In the event the potency becomes lowered to the required level before exhaustion is complete the finished product may be set aside and the additional weak percolate obtained from exhausting the drug may be stored in the cold room and used as the first menstruum for the next lot to be manufactured.

Type process "C" may also be used to advantage when assaying crude ergot by the official Cock's Comb method. In this case, percolation must be continued until exhaustion is complete as proven by the above tests even though the total volume becomes greater than 1 l. Rarely is it necessary to appreciably exceed this volume to ensure exhaustion and never does the volume become so great as to interfere with the accuracy of the Cock's Comb method.

#### STABILITY OF FLUIDEXTRACTS PREPARED BY TYPE PROCESS "C"

Since proposing the change from Type Process "B" to Type Process "C," the question of comparative stability of the finished products has frequently been raised. Studies upon stability have been in progress for over two years, but are not yet ready for reporting in detail. It is possible to state at this time, however,

that, other conditions being identical, Type Process "C" Fluidextracts have proved to be fully as stable as Type Process "B" Fluidextracts

#### ADJUSTMENT OF $p_H$ OF FLUIDEXTRACT OF ERGOT

Following the well-known work of Swanson (8) dealing with the influence of  $p_H$  upon the stability of Fluidextract of Ergot, considerable attention has been directed toward this factor by several workers. Swanson's results indicated that the optimum  $p_H$  for stability was in the region of  $p_H$  3.0. The writer (12), in 1930, made recommendations relating to this factor, but even at the present time the subject needs clarification both as to the desirability of adjusting the  $p_H$  and also as to the method of accomplishment. In 1930, Wokes and Elphick (11) reported observations on extraction and  $p_H$  as related to the ergot problem, and stated that

Marvin R. Thompson (8)—has recently published a series of recommendations regarding ergot which will probably exert an important influence on the ergot monographs in the next edition of the U. S. Pharmacopœia. On the basis of Swanson's results he suggests that, in order to ensure efficient extraction of ergot and maximum stability of the product, the amount of hydrochloric acid used should be very carefully controlled, both during the process of extraction and in the finished product. Apparently, he assumes that control of the amount of hydrochloric acid used will be sufficient to ensure a fixed  $p_H$ .

They then very adequately prove this "assumption" to be incorrect. It is important to point out that the writer in making the recommendation thus referred to by Wokes and Elphick, was very fully aware of the fact that the use of a controlled amount of acid in the manufacture of Fluidextract of Ergot would not ensure a fixed  $p_H$  in the finished product. A private communication prompted them to very kindly publish a withdrawal of their criticism (14). The recommendation in question was deliberately so worded after careful consideration of all available evidence relating to  $p_H$  and stability. The writer believed then as now, that while a fairly acid  $p_H$  possibly favors the stability of solutions or extracts containing ergot alkaloids under certain conditions of storage, there is even to the present time no sufficient evidence which would warrant the time and effort necessary to accurately adjust the  $p_H$  at a certain fixed level. Smith and Stollman (3) obtained results which indicated that decreasing the  $p_H$  of Fluidextracts of Ergot by varying it between 5.2 and 2.2 does not favor its stability. At approximately the same time, Swanson and co-workers (13) reported further studies on this problem, from which they concluded that "no definite conclusions can be formulated that a certain hydrogen-ion concentration prevents the deterioration of the fluidextract or a solution of the pure ergot alkaloid," although their results caused them to state that their study would be pursued further. Thus it should be clearly apparent that the use of a carefully controlled amount of acid in the extraction menstruum can be made to ensure that the  $p_H$  of the finished product will fall, for example, between 3.0 and 5.0 in spite of the great and likewise variable buffer capacity of the usual run of ergot, provided that the extraction equipment is constructed of proper material. Existing evidence, including our own, does not at present indicate that there is any advantage in attempting to attain a level below  $p_H$  4.0. Indeed a series of fluidextracts adjusted at  $p_H$  4.5 to 5.5 have been observed during one year to retain their potency fully as well as those containing

more acid The details of this study will appear later, since no conclusions of value can be drawn at present

The above quoted statement recommending control of acidity of the finished fluidextract as well as of the menstruum was made because of knowledge then at hand that certain manufacturers of this product were using extraction equipment constructed of materials which reacted with the acid with the result that all of the acid used in the menstruum did not appear in the finished product Proper  $p_H$  determinations can be utilized to detect such a condition, this condition being objectionable not only because of the loss of acid, but also because of the appearance of foreign soluble matter in the finished product

Since Wokes and Elphick (11) have published their work on extraction and  $p_H$  in detail, and since the observations in our laboratory on this subject completely confirm their results, it is felt that there would be little justification in taking the space necessary for presenting our detailed observations The study on this phase of the ergot problem is now sufficiently complete to warrant certain statements of fact which should prove helpful, particularly with respect to the adjustment of  $p_H$  as follows

1 Ergot is comparatively rich in substances capable of exerting a buffer effect particularly phosphates, although the phosphates do not account for the total buffer capacity Other inorganic as well as organic substances contribute to this effect Obviously, therefore, any extract of ergot cannot show the same  $p_H$  value as the menstruum used

2 The buffer capacity varies considerably from sample to sample Therefore even though menstrea of identical  $p_H$  are used fluidextracts from different lots of ergot are subject to considerable variation as to  $p_H$  There is no way to ensure a definite fixed  $p_H$  in a finished fluidextract by simply using a menstruum of a determined fixed  $p_H$

3 Having determined the  $p_H$  of a given fluidextract the amount of acid necessary to raise the acidity to a certain desired  $p_H$  value cannot be calculated without first accurately determining the buffer capacity of the sample It consumes much less time and effort to make the adjustment by simply adding the acid in small portions until the desired  $p_H$  level is attained

4 Ergot is distinctly acid in reaction and highly buffered Whether the diluted alcohol menstruum is acidified alkalinized or neutral, the first extract issuing from the percolator is acid in reaction showing a value in the vicinity of  $p_H$  5.0 to  $p_H$  6.0 As percolation proceeds and the buffer substances become extracted, the  $p_H$  of the issuing percolate gradually approaches that of the original menstruum employed not attaining the value of the original menstruum however, until extraction is complete

For example when a neutral menstruum is used the first percolate shows an acidity in the region of  $p_H$  5.3 As extraction progresses the  $p_H$  value gradually rises toward neutrality, ultimately reaching the  $p_H$  of the menstruum (in the region of  $p_H$  7.0)

If an acidified menstruum is used showing, for example a value of  $p_H$  2.0, the first percolate will show an acidity in the region of 5.3 as in the case of the neutral menstruum Then as percolation proceeds, the  $p_H$  value of the issuing percolate gradually becomes lowered toward the  $p_H$  value of the original menstruum (2.0)

When an alkalinized menstruum is used, showing for example, a value of  $p_H$  9.0 the first percolate will again show an acidity in the region of  $p_H$  5.0 to 6.0 Then as percolation proceeds the  $p_H$  value of the issuing percolate gradually becomes raised toward the alkaline  $p_H$  value of the original menstruum

From the above comments regarding  $p_H$ , it is obvious that the use of either a neutral or an acidified menstruum for the preparation of Fluidextracts of Ergot will result in products showing an acid  $p_H$  value Owing to the buffer capacity of ergot, which varies considerably from lot to lot, the  $p_H$  of the finished fluid-



extract will necessarily show a lower acidity than that shown by the acidified menstruum employed, and the actual  $p_H$  of different lots of finished product is subject to considerable variation even though a menstruum of fixed  $p_H$  is employed

The author is greatly indebted to Mr C T Ichniowski and Miss Dorothy Schmalzer for making a great many  $p_H$  determinations, and to Dr E G Vanden Bosche for his very active interest in supervising this phase of the work

NOTE The studies dealing with isolation and pharmacologic action of the various constituents and preparations of ergot particularly with respect to the recent clinical observations of Moir and Dale (15) will be reported shortly in a suitable publication

#### SUMMARY AND CONCLUSIONS

I Certain factors influencing the extraction of ergot have been studied and discussed

II A detailed description of a satisfactory technique for applying the Isolated Rabbit Uterus method of Broom and Clark has been presented

III The official U S P X process for the manufacture of Fluidextract of Ergot has been critically studied as to efficiency Experimental results have been presented showing that this process does not provide for the appearance of the total activity of the drug in the finished fluidextract, thereby providing for gross inaccuracies in the official method of assay for crude ergot, and likewise providing for economic loss in the commercial manufacture of this product

IV A method of extraction, which avoids the error in assaying crude ergot resulting from the inefficiency of the official extraction process, has been described The only objection to this method lies in the fact that the extracted activity is contained in a concentration too low to permit of the use of the official Cock's Comb method The percolate must be tested by the more sensitive Isolated Rabbit Uterus method or the Colorimetric method

V Chemical tests for proving exhaustion of the drug of activity have been developed and described, and their limitations indicated

VI The U S P General Type Process "C" for fluidextracts, has been studied upon ergot This process was found to be very significantly superior, from the standpoint of efficiency, to the Type Process "B" now specified by the U S P A change from Type Process "B" to Type Process "C" was recommended to the U S P Committee of Revision in November 1931, on the basis of these results, *first*, because Type Process "C" afforded more accurate results in the assay of crude ergot, and *second*, because this process avoids a considerable loss of activity in actual manufacture of the product This product, of course, is suitable for direct assay by either the official Cock's Comb, the Rabbit Uterus or the Colorimetric method In utilizing this process for assaying crude or powdered ergot, the chemical tests for exhaustion should be employed

VII The  $p_H$  factor in extracting ergot has been discussed

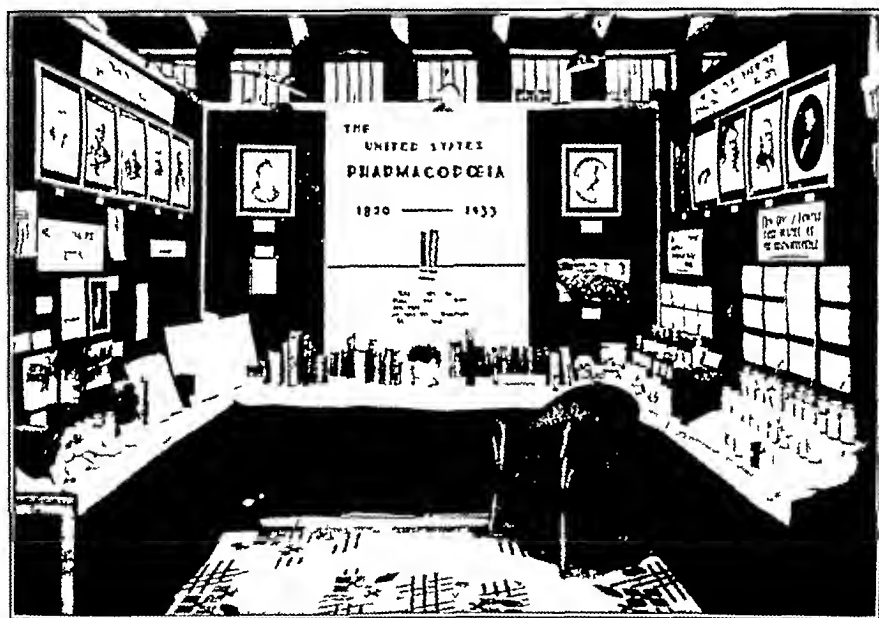
#### REFERENCES

- (1) Thompson *Jour A Ph A* 18 (1929), 1106
- (2) Wokes and Elphick *Quart J Pharm and Pharmacol* 2 (1929) No 4 539
- (3) Smith and Stollman *J Pharmacol and Exp Ther* 18 (1931), 621
- (4) Smith *Public Health Report* No 26, Vol 45 (1930), 1466

- (5) Broom and Clark *J Pharmacol and Exp Ther*, 22 (1923), 59
- (6) Burn and Ellis *Pharm J* 118 (1927), 384
- (7) Pattee and Nelson, *J Pharmacol and Exp Ther*, 36 (1929), 85
- (8) Swanson, *JOUR A PH A*, 18 (1929) 1127
- (9) Thompson *Ibid* 19 (1930) 113
- (10) Thompson *Ibid* 19 (1930), 718
- (11) Wokes and Elphick, *Quart J Pharm and Pharmacol* 3, No 4 (1930) 599-625
- (12) Thompson *JOUR A PH A* 19 (1930) 705
- (13) Swanson, Powell Stevens and Stuart *Ibid* 21 (1932), 320
- (14) Wokes and Elphick, *Quart J Pharm and Pharmacol* 4, No 1 (1931), 101
- (15) Moir and Dale *Brit Med J* (June 18 1932), 1119

### PHARMACOPŒIAL EXHIBIT AT THE A M A CONVENTION

Herewith is shown the United States Pharmacopœial exhibit, installed at the convention of the American Medical Association Milwaukee during the week of June 12th The exhibit was arranged by courtesy of the College of Pharmacy of the University of Wisconsin and Edward J Ireland and Al Rheinbeck were responsible for the display



U S P Exhibit at Milwaukee A M A Meeting

On the left of the picture may be seen an illustrated history of the Military Pharmacopœia of 1778 known as the Lititz Pharmacopœia In the picture is shown Dr William A Brown military surgeon with George Washington's army during their stay at Lititz Pennsylvania, the Moravian Brethren's house in which the Pharmacopœia was written, to the left of Dr Brown's photograph is a copy of the early pharmacopœia The pharmaceutical preparations in the foreground were made by the pharmacy students according to the original formulas

Continuing from the left may be seen pictures of modern pharmacopœias then a reproduction of the Ebers Papyrus an Epitome of Claudius Galen written in 1571, a copy of Dioscorides'

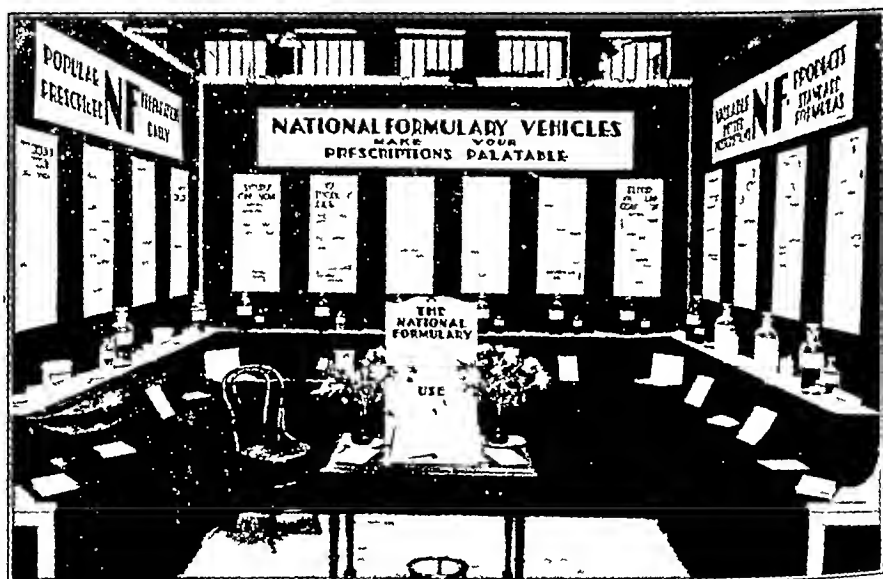
Materia Medica, two volumes of Hippocrates Medical Works, six early medical writings from German and Italian cities, pharmacopœias from Italy, France, India, Germany, England Ireland Scotland, Japan A complete set of the United States Pharmacopœia features the center of the exhibit, in the immediate center, there were living plants of *Lobelia syphilitica* Along the right wall may be seen a display of Dover's Powder with its pharmacopœial history The old wooden mortar was one obtained from Syria, and is reputed to be over three hundred years old Photographs on the walls show prominent pharmacopœial workers, note also July JOURNAL A PH A, page 591

### THE NATIONAL FORMULARY EXHIBIT AT THE AMERICAN MEDICAL ASSOCIATION CONVENTION

For the third successive year, the National Formulary occupied a booth in the Scientific Exhibit at the Convention of the American Medical Association, held this year at Milwaukee during the week of June 12th

Much that has been said concerning the previous N F exhibits (see JOUR A PH A August 1931 page 742 and June 1932, page 536) might be repeated here, for the physicians in attendance showed the same enthusiasm regarding the items shown, and the idea in general as was indicated both in the Philadelphia and the New Orleans displays

It will be recalled that at the Philadelphia meeting two years ago the exhibit consisted entirely of vehicles and it is doubtful whether the N F can ever present anything of more general interest than this group of preparations so useful in prescription writing At the New Orleans convention several of these more valuable vehicles were again shown together with an additional group of popular N F items Again the vehicles received the greatest attention Consequently



National Formulary Exhibit

when it came time to determine what was to be included in the 1933 presentation, it was decided to again repeat some of these vehicles So far as the physicians in attendance are concerned this plan does not mean repetition for one finds that the great majority of visitors are from local or nearby territory, this in fact being particularly true when meetings are held in such diversified sections of the country The correctness of this statement was borne out by the fact that the vehicle section of the exhibit once more received the greatest attention

The general lay-out followed that of past exhibits and the overhead cards were the same as those used last year to such good effect The center or rear section displayed the following

cludes Syrup of Cinnamon, Aromatic Syrup of Eriodictyon, Syrup of Glycyrrhiza, Syrup of Raspberry, Compound Elixir of Taraxacum, Compound Elixir of Vanilla

In each case actual prescriptions were prepared showing the particular masking ability of the vehicle in question and physicians were quite delighted in tasting many of these prescriptions, to find that the mask was nearly perfect. The Syrup of Cinnamon was again used for Salicylates, the Glycyrrhiza and Raspberry for Bromides or salty preparations, while the Eriodictyon was shown with Quinine attention being called to the recent work of Fantus which explains the value of this product with bitter alkaloids. The Compound Elixir of Taraxacum was again shown with Phenobarbital, a combination giving a compound prescription which has its advantages in cases of this type.

On the left side were again exhibited solid petroxolin and Compound Menthol Nebula together with Solution of Aluminum Acetate and Zinc Paste all of which received considerable attention. The right side was taken up with Aromatic Castor Oil Emulsion of Castor Oil Emulsion of Cod Liver Oil and Egg and Solution of Iron Peptonate.

It is rather difficult to imagine it, but the Aromatic Castor Oil received as much attention as the best vehicle. Few physicians as well as few pharmacists realize how thoroughly the disagreeable oily taste of Castor Oil is covered in this product. The aromatics not only completely cover the taste but also seem to destroy the heavy oily feeling so characteristic of the plain oil. One physician, an obstetrician, declared that becoming acquainted with this one preparation made attendance at the convention worth while. A number of physicians noted the Latin title and were quite pleased when they realized they could prescribe this old "stand by" in Latin, as that, together with the masked taste, would never give it away as "Castor Oil."

In the Cod Liver Oil Emulsion particular attention was called to the use of Tincture of Sweet Orange Peel as a preservative and flavor. This replaced the alcohol in the regular formula while simple syrup was used in place of syrup of tolu, no additional flavoring agent being required. The result is splendid, the orange taste remaining long after the Cod Liver Oil taste has disappeared. This revised formula will probably be accepted for the new N. F.

Nearly a thousand booklets were distributed during the Convention and the demands for samples of prescriptions were so numerous that it was necessary to obtain an additional supply of the paper spoons used for sampling.

It is unfortunate that more pharmacists do not realize the great desire on the part of physicians for information such as was given here. There is no question in the mind of the writer that one of the greatest opportunities for development of professional work and a spirit of confidence in the pharmacist, lies in just such a program as the N. F. has barely touched in these presentations. The physicians realize their need of this information and are more than anxious to obtain it. Why should pharmacists neglect such an opportunity to serve?—ADLEY B. NICHOLS

#### PLANT SCIENCE SEMINAR

The following letter has been mailed to members of the Plant Science Seminar.

The Seminar will hold its annual meeting at Madison, Wisconsin, August 21st to August 25th. Headquarters will be at 115 Langdon Street, the Chi Omega Sorority House. Arrangements for rooms have been made as follows: One dollar each for the first night and fifty cents for each following night. The rooms may be retained for the Seminar and A. P. H. A. Convention if desired. The House is conveniently located near the lake and not far from the Headquarters Hotel of the A. P. H. A. Convention. The rooms are excellently furnished with twin beds. A few large rooms have three beds which will be reserved for parties of three. The entire house will be at our disposal and the large rooms on the first floor will be available for our meetings. The house maintains a private pier in the lake and the committee suggests that you bring your bathing suits.

It is very important that we have your reservation as soon as possible in order that we may make final arrangements. Please send your reservation to F. J. Bacon, Sunset Drive, Shorewood Hills, Madison, Wisconsin.

We are enclosing a program and maps of Madison and the scheduled collecting trip. Bring your hiking clothes and collecting equipment.

Please bring the enclosed circular to the meeting with you, since no further program will be printed.

# BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy N W cor Lombard and Greene Sts , Baltimore, Maryland

## APPARATUS AND MANIPULATIONS

Wruble Milton  
Studies in percolation  
*JOUR A PH A*, 22 (1933) 641

## PHARMACOPŒIAS AND FORMULARIES

Anon  
Review of the new Danish Pharmacopœia  
*Pharm J* 131 (1933) 31  
Stamier Carl  
Some remarks on the Belgian Pharmacopœia  
IV  
*J pharm Belg* 15 (1933) 441 459

## PHARMACEUTICAL PREPARATIONS

Azzolini B  
Liquid extract of equisetum  
*Officina*, 5 (1932) 80, through *Chem Abstr* 27  
(1933) 3289  
Eschenbrenner H  
Sterilization of sodium bicarbonate solution  
*Pharm Zentralh* 74 (1933) 396  
Gore L F  
Tincture of hyoscyamus  
*Pharm J* 130 (1933) 483  
Hersant E F, and Linnell W H  
Stability of ergot preparations  
*Pharm J* 131 (1933), 3  
Jorek E  
New ointment bases  
*Pharm Ztg* 78 (1933) 667  
Lum E A  
Arsenical solution, B P, 1932  
*Pharm J* 130 (1933) 412  
Neuman Alfred  
Spirit of ethyl nitrite  
*Pharm Ztg* 78 (1933) 682  
Obergard I A  
Preparation of Burow's solution  
*Klin Farm Prom* (1933) 19-22, through  
*Chem Abstr* 27 (1933) 3289  
Pajetta E  
Changes and keeping qualities of ferrous iodide  
syrups

*Officina* 5 (1932) 261 through *J Soc Chem  
Ind*, 52 (1933) 523  
Regnier Jean *et al*  
Loss in anesthetic power of cocaine solutions  
under the influence of heat and prolonged  
storage  
*Bull sci pharmacol* 40 (1933) 353  
Tonn, O  
Use of yeast preparations in the making of pills  
*Pharm Zentralh*, 74 (1933) 377

## PHARMACOLOGY TOXICOLOGY AND THERAPEUTICS

Barbour Henry G and Fisk Merl E  
Liver damage in dogs and rats after repeated  
oral administration of cinchophen, tolysun  
and sodium salicylate  
*J Pharmacol & Exper Therap*, 48 (1933) 341  
Chen K K, *et al*  
Pharmacological action of peimine and pei-  
minine  
*JOUR A PH A* 22 (1933), 638  
Christensen B V, and Lynch H J  
Effect of anthelmintics on the host I Tetra-  
chloroethylene II Hexylresorcinol  
*J Pharmacol & Exper Therap*, 48 (1933), 311  
Cutting W C, *et al*  
Action and uses of dinitro-phenol  
*J A M A* 101 (1933) 193  
Defandorf James H  
Studies on the bioassay of digitalis Frog  
methods  
*JOUR A PH A* 22 (1933) 599  
Fouts P J, and Zerfas L G  
Liver-gastric tissue preparations in treatment of  
pernicious anemia  
*J A M A* 101 (1933), 188  
Geiger J C  
Methylene blue solutions in potassium cyanide  
poisoning  
*J A M A* 101 (1933), 269  
Gersdorff W A  
Comparison of the toxicity of nicotine and ana-  
basine  
*J Am Chem Soc* 55 (1933), 2941

- Gutman, Alexander B, *et al*  
Comparison of effect of diiodotyrosine and inorganic iodine in hyperthyroidism  
*J A M A* 101 (1933), 256
- Majidson, O J, and Strukow, I Th  
Derivatives of 8-aminoquinoline as antimalarial preparations  
*Arch Pharm*, 271 (1933), 359
- Offerhaus C, and Baert, C G  
Anesthetics, particularly cocaine and novocaine  
*Pharm Weekbl*, 70 (1933), 617 655
- Rappaport, B Z and Reed, C I  
Effect of viosterol of high potency in hay fever and related conditions  
*J A M A*, 101 (1933), 105
- Rath, Erich, and Schunck, C  
Hypnotic properties of cyclopentenyl-ethylbarbituric acid  
*Munch med Hochenchr*, 80 (1933), 564 through *Chem Abstr*, 27 (1933) 3288
- Regnier, M T, and Simonnet H  
Contribution to the biologic assay of the parathyroid hormone  
*J pharm chim*, 17 (1933) 560
- Roe, Harold E  
Fatal case of methemoglobinemia following the administration of bismuth subnitrate  
*J A M A*, 101 (1933), 352
- Schlenk, W, *et al*  
Synthetic experiments in the series of sterols and sexual hormones  
*J Soc Chem Ind*, 52 (1933) 209T
- Wells, C Alex  
Reaction after the injection of sodium morrhuate  
*Brit Med J* (1933), 674

## BOTANY AND PHARMACOGNOSY

- Ajello T  
Investigations on the active principle in *Attractylis gummifera*  
*Gazz chim ital*, 63 (1933) 99 through *Chem Abstr*, 27 (1933) 3556
- Dieterle, H, and Kaiser, Ph  
Constituents of the rhizome of *Curcuma domestica*  
*Arch Pharm*, 271 (1933), 337
- Fuji, K, and Shimada, H  
Constituents of the root of *Sanguisorba officinalis* L  
*J Pharm Soc Japan*, No 616 (1933) 120
- Hayden Alice H, and Jordan C B  
Chemical study of *Ma Huang*  
*Jour A Ph A* 22 (1933), 616

- Henrotin, Marie  
Contribution to the study of *Strophanthus* seed  
*J pharm Belg*, 15 (1933), 479
- Jaretsky, R, and Kühne, F  
Pharmacognosy of *Tanacetum vulgare*  
*Arch Pharm*, 271 (1933), 353
- Kosler, L, and Marek, M  
Sarsaparilla in the new German Pharmacopœia  
*Pharm Monatsh*, 14 (1933), 127
- Martin Sans, E, and Mathou, Thérèse  
Falsified angustura  
*Bull sci pharmacol*, 40 (1933), 350

## ALKALOIDS AND GLUCOSIDES

- Biedebach, Felix  
Note on the Helch reaction for pilocarpine  
*Apoth-Zig*, 48 (1933), 723
- Craig L C  
New synthesis of normicotine and nicotine  
*J Am Chem Soc*, 55 (1933) 2854
- Heldt, L J, and Forbes, G S  
Absorption and fluorescence spectra of the acid sulphates of quinine and ten derivatives in aqueous sulphuric acid solution  
*J Am Chem Soc*, 55 (1933) 2701
- Jermstad, Axel, and Ostby Ottar  
Iodometric determination of caffeine  
*Dansk Tids Farm*, 7 (1933), 117
- Kosler, L, and Kosler, A  
Melting point and crystal forms of morphine  
*Arch Pharm*, 271 (1933) 387
- Mohs, Paul  
Glucosides of *Digitalis lanata*  
*Arch Pharm*, 271 (1933) 393
- Orechoff, A  
Alkaloids of *Berberis heteropoda*  
*Arch Pharm*, 271 (1933) 323
- Sabatucci, Nicoletta  
Detection of quinotoxine in some cinchona barks and in galenical preparations  
*Scienza farm* 1 (1933) 4, through *Chem Abstr* 27 (1933), 3556
- Stoll A, and Kreis, W  
Digitalis glucosides  
*Bull sci pharmacol* 40 (1933) 321

## OILS, FATS AND WAXES

- Fiero George W  
Chemical examination of the oil of ergot  
*Jour A Ph A* 22 (1933), 608
- Royce, H D  
Stability of fats and oils  
*Ind Eng Chem, Analyt Ed* 5 (1933) 244

## ESSENTIAL OILS

- Anon  
Aniseed, fennel and star-anise oil  
*Parf France* 11 (1933) 106 through *Pharm J* 131 (1933) 37
- Dafert O, and Capesius V  
Oil of *Chenopodium ambrosioides*  
*Pharm Presse Wissensch Heft*, 38 (1933) 69
- Louveau G  
Aging and altering of essential oils  
*Rev marg parfum savon* (1932) Nos 1-6  
through *Chem Abstr* 27 (1933) 3556
- Reed R M  
Identification of phenols in essential oils  
*Perf & Ess Oil Rec* 24 (1933) 190
- Vignoli, L  
Estimation of crystallizable apiol  
*Bull sci pharmacol*, 40 (1933), 344

## ANALYTICAL METHODS AND RESULTS

- Benedetti Pichler, A A, and Schneider, Frank  
Quantitative isolation of ether from dilute solutions  
*Ind Eng Chem Analyt Edit* 5 (1933) 255
- Collins W D *et al*  
Recommended specifications for analytical reagent chemicals  
*Ind Eng Chem Analyt Edit*, 5 (1933) 288
- Fischer, G G  
Colorimetric investigation of the saffron test  
*Apoth-Ztg*, 48 (1933) 747
- Guerbet, André  
Remarks on the estimation of iodine by the Carius method  
*J pharm chim* 17 (1933), 556
- Gutman, A B, *et al*  
Assay of thyroid by chemical estimation of the thyroxine content  
*Proc Soc Exptl Biol Med*, 29 (1932) 1198, through *Chem Abstr* 27 (1933), 3555
- Hames R T M  
Variation in samples of sodium morrhuate  
*Lancet* (1933), 5 719 748
- Jenkins, Glenn L and Hoshall Edward M  
Assay of N F preparations containing pepsin  
*JOUR A PH A*, 22 (1933) 625
- Munro A C, and Seifert R  
Estimation of pepsin  
*Pharm J* 130 (1933) 432
- Noto, F and Perciabosco F  
New method for the identification of oxalic acid in citric acid  
*Ann chim applicata* 23 (1933), 21 through *Chem Abstr* 27 (1933) 3287

- Palmer W W, and Leland, J P  
Observations on Mörch's method for the standardization of thyroid preparations  
*Proc Soc Exptl Biol Med*, 29 (1932) 1195 through *Chem Abstr* 27 (1933), 3555
- Raquet, D, and Pinte, P  
Rapid iodometric estimation of phosphites and hypophosphites individually or in mixtures  
*J pharm chim*, 18 (1933), 5
- Rohmann, C  
Contribution to the quantitative analysis of aluminum acetate solution  
*Pharm Zentralh* 74 (1933) 393
- Vishnevskia, K  
Determination of phenolphthalein in tablets  
*Farm Zhur* (1933), 77
- Weissmann G  
Determination of phenacetin, aspirin and anti febrin  
*Z anal Chem*, 93 (1933), 31, through *Chem Abstr*, 27 (1933), 3557

## INORGANIC CHEMICALS

- Goris A, and Richard F  
Zinc peroxides of commerce  
*Bull sci pharmacol*, 40 (1933) 336

## ORGANIC CHEMICALS

- Florence, G  
Acetophenone and some of its derivatives  
*Bull sci pharmacol* 40 (1933), 325
- Gardner J H *et al*  
Anesthetics containing the morpholine ring II  
*J Am Chem Soc* 55 (1933) 2999
- Gulati, K. Ch *et al*  
Antiseptics and anthelmintics I 1-Alkyl 2 naphthol  
*J prakt Chem* 137 (1933) 47, through *Chem Abstr*, 27 (1933), 3558
- Hinegardner W S  
Racemization of chaulmoogric and hydnocarpic acids  
*J Am Chem Soc* 55 (1933) 2831
- Leger E  
Hydrolysis of the aloins  
*J pharm chim* 18 (1933) 25
- Milshtein A, and Rozenberg, G  
Preparation of ether for anesthesia  
*Farm Zhur* (1933), 77
- Rising M M *et al*  
Synthesis of colored derivatives of phenobarbital  
*J Am Chem Soc* 55 (1933), 2817
- Wagner, Jauregg Th  
Chemistry of the vitamins  
*Arch Pharm* 271 (1933), 369

## A STUDY OF VEHICLES FOR MEDICINES

BY BERNARD FANTUS, H A DYNIEWICZ AND J M DYNIEWICZ

*(Continued from page 658, July 1933)*

## ISO-ALCOHOLIC ELIXIRS

It is now thirteen years (4) since the idea of "iso alcoholic elixir" was brought forward. By this term is meant an elixir of an alcoholic strength just sufficient to dissolve the medicament for which the elixir is to serve as a vehicle. To accomplish this, we require two basic elixirs: 1, an *aqueous elixir* containing a minimal percentage of alcohol and an *alcoholic elixir* containing a high percentage of alcohol. These two have to be mixable in all possible proportions. The advantage of using the term "iso-alcoholic elixir" (5) in prescribing, lies in the fact that it is practically impossible for the physician to remember the exact alcoholic strength required for dissolving all the various drugs he prescribes. It would surely be a great comfort to him, could he, by employing this designation, feel assured that the pharmacist would always deliver a perfectly clear and compatible preparation. This the pharmacist could readily do, possibly with the aid of his reference books, if he had the two basic elixirs in stock. What happens when aromatic elixir is used instead of iso-alcoholic elixir is shown by the following experiments.

## EXPERIMENTS

1 Tincture of digitalis 0.5 cc. mixed with enough aromatic elixir to make a teaspoonful gives a copious precipitate. The same dose added to a mixture of alcoholic elixir 3 parts, aqueous elixir 1 part—the proportions of alcohol and water used in the menstruum—is of course, perfectly clear.

2 Tincture of veratrum viride 0.5 cc. added to aromatic elixir 4 cc., precipitates even more copiously than does the digitalis mixture. Using the alcoholic elixir, which is required by the strongly alcoholic menstruum employed in the extraction of the drug, yields a perfectly clear and safe preparation.

3 Tincture of aconite 0.3 cc. whose menstruum is alcohol 7 parts, water 3 parts, precipitates with the official aromatic elixir 4 cc. but naturally does not, when added to iso alcoholic elixir made in the proportions of alcoholic elixir 7, and aqueous elixir 3.

4 Tincture nux. vomica 0.5 cc. plus aromatic elixir 4 cc. is cloudy. The same dose added to the proper mixture of alcoholic and aqueous elixirs, 3 to 1, remains clear.

5 Tincture colehicum seed, 2 cc., added to aromatic elixir throws down a few flocculi. Using alcoholic elixir 3, and aqueous elixir 2, gives a clear preparation.

6 Tincture lobelia 1 cc. added to a mixture of equal parts of aqueous and alcoholic elixirs remains clear, while a precipitate forms with the aromatic elixir.

7 Fluidextract of buchu 2 cc. added to aromatic elixir yields a copious precipitate while a clear solution results when the dose is added to the alcoholic elixir.

8 The same is true when a dose of 0.1 cc. of fluidextract of cannabis indica is added to aromatic elixir while the alcoholic elixir yields a clear solution.

In all these experiments, the average pharmacopœial dose was added to enough elixir to make a teaspoonful. The turbidity resulting in all of these cases with the aromatic elixir of the U. S. P. is not only unsightly but introduces, in some of these instances, an element of danger, as many of these precipitates are toxic. Insufficient shaking of the bottle before taking would lead to a possibly dangerous inequality of dosage. In those preparations, on the other hand, in which the iso-alcoholic elixir was used, a perfectly clear preparation results.



In case of chemicals, the term iso-alcoholic elixir would obviously mean that mixture of aqueous or alcoholic elixir, or either of them alone, that would give a clear solution with the minimal percentage of alcohol

Thus, for instance, a physician who might want to prescribe the average Pharmacopœial dose of sodium bromide (1 Gm) in elixir, and who doubted, as he should, that this quantity would dissolve in aromatic elixir, might prescribe it with iso-alcoholic elixir as the vehicle. The pharmacist, knowing that this salt dissolves much more readily in water than in alcohol, would employ the aqueous elixir for its solution. The U S P aromatic elixir does not dissolve more than 0.60 Gm (10 gr) of sodium bromide per teaspoonful.

The use of the term "iso-alcoholic elixir" by the prescriber and the proper interpretation of it, by the pharmacist, would avoid the interesting incompatibility arising, when the physician prescribes chloral and bromide dissolved in elixir. In the aqueous elixir it is perfectly compatible. The same doses dissolved in the official elixir, results in the "salting out" of chloral alcoholate. If the attempt is made to dissolve the chloral and bromide in the alcoholic elixir, a great excess of sodium bromide remains undissolved.

A physician who might desire to prescribe an average official dose of terpin hydrate (0.25 Gm) in solution, need not worry about its solubility, if he specifies iso-alcoholic elixir as the solvent. The pharmacist would dissolve this dose in the alcoholic elixir, and thus secure a perfect solution of an active dose of terpin hydrate. Parenthetically, be it remarked, that the dose of the terpin hydrate in the N F elixir of terpin hydrate is merely 0.087 Gm, approximately  $1\frac{1}{2}$  grains, which is a rather small dose.

Professor Langenhan, having found that the two elixirs for the preparation of iso-alcoholic elixir, as previously elaborated, produced a turbidity in those dilutions in which the aqueous elixir strongly predominated (under certain temperature conditions), it was found desirable to increase the alcoholic strength of the "aqueous" elixir, to approximately 10 per cent of alcohol. This increase in the alcoholic strength might also improve its keeping qualities, which ought to be excellent in view of the fact that the preparation is now quite saturated with sugar. Our revised formula, therefore, would be as follows:

### ELIXIR AQUOSUM

#### Aqueous Elixir

#### Elix Aqu

Compound Spirit of Orange	10 0 cc
Alcohol	100 0 cc
Glycerin	200 0 cc
Sucrose	320 0 cc
Distilled Water, a sufficient quantity	

To make

---

1000 0 cc

Mix the alcohol, glycerin and water and add to them the compound spirit of orange agitating thoroughly from time to time and permit to stand twenty-four hours. Filter through a hard filter (Whatman 50) returning if necessary the first portions of the filtrate until it passes through clear. Dissolve the sucrose in the filtrate by agitation or percolation and add enough of the solvent mixture to make the product measure 1000 cc.

## ELIXIR ALCOHOLICUM

## Alcoholic Elixir

## Elix Alc

Compound Spirit of Orange	4 0 cc
Gluside	3 0 Gm
Glycerin	200 0 cc
Alcohol, a sufficient quantity	

To make

1000 0 cc

Dissolve the compound spirit of orange and the gluside in the alcohol, add the glycerin and sufficient alcohol to make the product measure 1000 cc and filter

## ELIXIR ISO-ALCOHOLICUM

## Iso-Alcoholic Elixir

## Elix Iso-Alc

Aqueous Elixir	a certain proportion
Alcoholic Elixir	a certain proportion
Mix them	

Iso alcoholic elixir is intended to serve as a general vehicle for various medications that require solvents of different alcoholic strengths. When, therefore, iso-alcoholic elixir is specified in a prescription, that proportion of its two ingredients is to be used that will produce a perfect solution.

For liquid galenicals, the strength of iso-alcoholic elixir to be used is the same as that of the menstruum or solvent employed in the preparation of the galenical.

When galenicals of different alcoholic strengths are used in the same prescription, the iso-alcoholic elixir to be used is to be of such strength as to secure the best solution possible under the circumstances. This will generally be found to be the average of the alcoholic strength of the several ingredients.

For non-extractive substances, the lowest alcoholic strength of iso-alcoholic elixir should be chosen that will yield a perfect solution. For substances that are readily soluble in water and less soluble in alcohol, the aqueous elixir is to be used. For substances that are readily soluble in alcohol and insoluble in water, the alcoholic elixir is to be employed.

TABLE FOR ADJUSTMENT OF ALCOHOLIC STRENGTH OF ISO ALCOHOLIC ELIXIR

Aqueous Elixir	Alcoholic Elixir	Suitable as Vehicle for Preparations Requiring the Following Alcoholic Strengths
Aqueous Elixir		0-10%
4 parts	1 part	10-20%
3 parts	1 part	20-30%
2 parts	1 part	30-40%
1 part	1 part	40-50%
1 part	2 parts	50-60%
1 part	3 parts	60-70%
1 part	4 parts	70-80%
Alcoholic Elixir		80-95%

A comparison of the two above given formulas will show the apparent incongruity that there is a great deal more of the compound spirit of orange in the aqueous than in the alcoholic elixir. This may seem all wrong, in view of the fact that much more of the compound spirit of orange will dissolve in the alcoholic

than in the aqueous elixir. In point of fact, however, it is not necessary to add more than the 0.4% of the compound spirit of orange as suggested in the formula for the alcoholic elixir, to make it fully as strongly flavored as the aromatic elixir which no doubt contains, when cleared of the excess of oil, even a smaller percentage than that. The only justification for using so large a proportion of the compound spirit of orange in the preparation of the aqueous elixir lies in the observation we made that this larger proportion produces a more fully flavored elixir than any smaller proportion would. It seemed as well flavored as if we had used the more water-soluble "terpeneless" oil of orange. As the expense of this latter quality of the oil of orange is prohibitively great, we believe that we are dissolving out some of this portion from the large excess of the oil of orange we are using, and it is cheaper to waste the rest than to insist upon the terpeneless oil.

Incidentally, it might be noted that the alcoholic elixir, as it contains no sugar, might be used as a pleasant vehicle for medicaments intended for the diabetic, in whom the sugar-containing aromatic elixir would be contraindicated.

#### CONCLUSIONS

1. The present formula for the preparation of aromatic elixir is very time consuming.

2. To lessen the time required, the following modifications of the official formula are proposed: (a) lessen the viscosity by dissolving the sugar after clarification, (b) dispense with the necessity of using talcum by securing dispersion of the oil mixture in droplets large enough to be intercepted by a hard filter, (c) by permitting the mixture to stand for some time with occasional agitation before filtration, saturation of the solvent can, no doubt, be secured even by the larger droplets. A formula embodying these principles is submitted.

3. Formulas are advanced for an "aqueous elixir" and an "alcoholic elixir," which are mixable with each other in all proportions. The official recognition of these elixirs would make it possible for the physician to prescribe "iso-alcoholic elixir," meaning by the term an elixir of the same alcoholic strength as the menstruum of the galenic preparation for which it is to serve as vehicle.

#### REFERENCES

- (1) Silver, *Practical Druggist*, 48 (1930) 37
- (2) Schifflet *Ibid* 48 (1930), 17
- (3) Krantz and Carr "Further Studies in Filtration," *JOUR. A. PH. A.* 21 (1931), 785
- (4) B. Fantus, *Ibid* 9 (1920) 708
- (5) B. Fantus and C. M. Snow, *Ibid*, 10 (1921) 277

#### IVY POISONING

The Ohio State Division of Conservation is advocating the use of a 5 per cent solution of potassium permanganate as a first aid or emergency treatment for ivy poisoning in response to many inquiries from anglers and campers. It should be applied by swabbing with cotton or soft cloth. This treatment is recommended by Dr. J. F. Couch of the U. S. Department of Agriculture.

The Division also broadcasts the information

that ivy poisoning can be prevented in many cases by using the following wash, devised by Dr. J. B. McNair of Field Museum, Chicago: 5 per cent solution of ferric chloride in a 50:50 mixture of water and glycerin. Before going out wash the exposed part of the skin and allow the solution to dry before subjecting the exposed parts to possibility of infection. The iron in the mixture combines with the poisonous element in the ivy and changes it into a harmless, non-poisonous compound.

DETERMINATION OF THE REASONABLE OR PERMISSIBLE MARGIN  
OF ERROR IN DISPENSING \*BY MARVIN J ANDREWS <sup>1</sup>

## INTRODUCTION

The compounding and dispensing of medicines ordered by physicians is the primary function of the pharmacist in his relationship to the public. The education and training which the pharmacist is required to have before he is granted a license to practice and the legal restrictions otherwise thrown about the practice of pharmacy are indicative of the importance which the public attaches to the proper exercise of this function. It is believed that the great majority of pharmacists of this country recognize fully the responsibility which is theirs in this regard and take every precaution that can reasonably be expected of them to compound prescriptions accurately. In spite of the precautions taken, however, errors in compounding and dispensing are made. Occasionally, they are of such magnitude that untoward symptoms of unmistakable origin develop after the medicine is administered, when the error is detected and brought to notice. More frequently, however, the error made is comparatively small or the reaction of the patient is attributed to the malady instead of the remedy and it passes by unnoticed.

To err when reasonable precautions are taken to avoid doing so cannot be attributed to ignorance, carelessness or negligence. It must be attributed to other factors—factors over which even the most careful compounder has little or no control. The personal equation, for instance, enters into every operation involved in the filling of a prescription. In addition, there are the variations in the calibration of measuring utensils and the inaccurate adjustment of scales or balances to be reckoned with. As a matter of fact, it is impossible to fill any prescription without deviating to some extent from the quantities ordered by the prescriber. No measurement or weighing is ever free from error due to one or more of the factors mentioned above, but with the exercise of care, such error can be reduced to a reasonable minimum. To determine the magnitude of this reasonable minimum is the purpose of the studies reported in this series of papers.

Some work has already been done along this line. It is possible that fairly extensive investigations have been made in some of the countries of Continental Europe in which dispensing is carried on under close governmental supervision, but in Great Britain and in this country, where this rigid control is lacking, studies sufficiently extensive and comprehensive to justify the use of the data obtained as a basis for fixing the limit of reasonable or permissible error in the compounding of all but a few of the many types of prescriptions filled in the pharmacies of to day do not appear to have been made. A résumé of the work of this character done in the two countries last named over the past sixty years follows.

As far back as 1872, C. William Grassley examined 165 samples of Seidlitz powders purchased in this country and in Canada for accuracy with respect to ingredient content

\* Section on Practical Pharmacy and Dispensing, A. P. H. A. Toronto meeting 1932

<sup>1</sup> In collaboration with A. G. DuMez, Professor of Pharmacy, School of Pharmacy, University of Maryland

<sup>2</sup> PROC. A. P. H. A. 20 (1872) 273-300

Only 2 of the 165 were found to have been accurately prepared. The error in the 163 other samples was attributed largely to the fact that the powders were made by measuring instead of weighing. Depending on the pressure exerted in filling, the capacity of the larger cavity (used for measuring the Seidlitz mixture) of the double-cup measure in general use was found to be 95 to 120 grains and that of the smaller cavity (used for measuring the tartaric acid) 20 to 24 grains.

In an editorial which appeared in the *Pharmaceutical Journal and Pharmacist* for April 12, 1924,<sup>1</sup> mention is made of some dispensing tests carried out in London in 1889. Those who made these tests are reported to have stated that only 6% of the prescriptions compounded by "chemists and druggists" were found to be inaccurate and to have expressed the view that 10% was an allowable margin of error in individual cases. Unfortunately these are all of the details carried in the editorial and the original report printed in *Chamber's Journal* is not available.

In 1889, E. B. Stuart and E. B. Tainter<sup>2</sup> published a report on the degree of accuracy attained by 37 pharmacists in dispensing the following prescriptions for powders: Prescription No. 1, ferric oxide 0.1 Gm., sugar 10 Gm., to be divided into 10 powders; Prescription No. 2, Dover's powder, 3.0 Gm., to be divided into 6 powders; Prescription No. 3, powdered rhubarb, magnesia of each 2.5 Gm., to be divided into 15 powders.

The average error was found to be 4.8% for prescription No. 1, 9.4% for prescription No. 2 and 9.45% for prescription No. 3. For prescription No. 1, the error was less than 5% in 21 instances, between 5% and 10% in 14 instances, between 10% and 15% in one instance and more than 20% in 1 instance. For prescription No. 2, the error was less than 5% in 22 instances, between 5% and 10% in 9 instances, between 10% and 15% in 5 instances and 16.5% in 1 instance. For prescription No. 3, the error was less than 5% in 17 instances, between 5% and 10% in 5 instances, between 10% and 15% in 8 instances and more than 20% in 6 instances.

The *Pharmaceutical Journal and Pharmacist* for December 9, 1922,<sup>3</sup> calls attention to some of the results of an investigation made by the Public Health Committee of the Middlesex County Council to ascertain the accuracy with which medicinal powders were dispensed. In one case, the 6 powders supplied weighed from  $2\frac{3}{4}$  to 5 grains each, averaging 4 grains. In two other instances, the 6 powders supplied varied in weight from 5 to 9 grains each. In two cases, no powder weighed more than  $5\frac{1}{2}$  grains. A subsequent examination of the scales and weights of the pharmacists concerned is reported to have revealed that the inaccuracies were not wholly due to maladjustment of the weighing appliances.

Within the past year and a half, two papers dealing with the subject have appeared in print, one by John Butler<sup>4</sup> reporting the results of an investigation made in England and the other by Dr. John C. Krantz, Jr.,<sup>5</sup> reporting the results of the examination of certain preparations purchased from pharmacists in Baltimore, Maryland.

In the report made by Mr. Butler, data are given to show the error made by "dispensing chemists" in the compounding of certain liquid potassium bromide mixtures. These data show that in 4 of the 40 potassium bromide mixtures examined, the error with respect to potassium bromide content was greater than 10%, in 34, the error was below 5% and in 27 the error was below 3.5%. Mr. Butler states further that most "chemists" are of the opinion that an error of 10% should be allowed and that this is accepted by most Pharmaceutical Service Subcommittees as a fair margin in the dispensing of certain types of mixtures.

Dr. Krantz reported the probable error with respect to potassium iodide content to be 9.55% for 10 samples of Saturated Solution of Potassium Iodide, N. F. V., examined.

<sup>1</sup> *Pharm. J. & Pharm.*, 112 (1924), 397.

<sup>2</sup> *Proc. A. P. H. A.*, 37 (1889), 183-188.

<sup>3</sup> *Pharm. J. & Pharm.*, 109 (1922), 545.

<sup>4</sup> *Ibid.*, 128 (1932), 149.

<sup>5</sup> *Maryland Pharmacist*, 7 (1932), 543-545.

For 17 samples of Tincture of Ferrie Chloride, U S P X, examined, the probable error with respect to iron content was computed to be 6.45%. In two batches of twelve 5-grain quinine capsules prepared by pharmacists, the probable error with respect to quinine content was computed to be 25.11% and 5.08% respectively.

The data presented in the foregoing reports, although inadequate and in some instances unsuited for the purposes of this study, are nevertheless of some value. They at least lend weight to the statement already made, that deviation from the quantities ordered is the general rule in dispensing rather than the exception, and show that there is need for further systematic investigation along these lines to enable us to fix the margin of error which may be accepted as reasonable or permissible. The British appear to have accepted 10% as the "allowable" margin of error for certain types of prescriptions, at least. Whether or not this margin is the proper one for all types of prescriptions still remains to be proven.

#### EXPERIMENTAL PART

The different types of prescriptions which the pharmacist is ordinarily called upon to fill may be divided, roughly, into two classes, namely, liquids and solids. With respect to the magnitude and frequency of the error to be expected, the latter class seemed to offer the greatest possibilities because of the more complicated nature of the operations involved in filling prescriptions of that type. For these reasons and because powders and capsules are actually prepared by the pharmacist more frequently than any of the other types of this class, they were selected as the types to be used in beginning this study.

#### POWDERS

With respect to the preparation of powders and this applies to the preparation of capsules as well, the division of the bulk powder into individual doses constitutes the greatest source of error. Furthermore, the error from this source is not constant since the magnitude is dependent to a considerable extent upon the *modus operandi* by which the division is made. Of the many methods which have been suggested for effecting this division, the majority have as their chief aim speed in completing the task rather than accuracy. The following are the methods which are in general use. They were, therefore, used in making the studies reported herein.

(1) The guess by eye method in which small portions of the powder are transferred to papers by means of a spatula, and when all has been thus transferred the quantities on the different papers equalized as nearly as possible by eye.

(2) The method of blocking and dividing which consists of transferring the bulk powder to a tile or a piece of glazed paper, building it up into a rectangular pile or a parallelogram, by means of two straight edged spatulas, and dividing the pile thus formed into the desired number of parts by cutting with a spatula.

(3) The method of weighing in which the amount to be contained in each powder is weighed off separately. When this method is followed, the last powder will be underweight if the scales have been properly adjusted and the weighings accurately made, because some of the material will adhere to the sides of the mortar in which the powder was mixed or be lost in some other way. This expected deficiency is generally avoided by preparing a sufficient amount of the bulk powder to make one or two extra powders.

In addition to the determination of the frequency and magnitude of error traceable to the *modus operandi* of dividing the bulk powder, the effort was also made to determine to what extent, if any, certain other factors influence the final result. It seemed desirable, for instance, to determine the effect of the nature of the ingredients, the number of ingredients, the size of the individual powders and the number of powders prepared. With these objectives in view, the following prescriptions were filled.

No 1		No 6	
Hydrarg Chlor Mit	gr ii	Quin Sulph	gr xv
Lactos	gr iii	Pulv Aloe	gr x
M et ft chart No 1		Ext Ergot	gr ii
D t d No viii		M et ft pulv No xii	
Sig One powd every 15 min		Sig One every 3 hours	
No 2		No 7	
Hydrarg Chlor Mit	gr $\frac{1}{6}$	Ext Casc Sagr	gr i
Pulv Ipecac	gr $\frac{1}{16}$	Ol Fœnic	gtt i
Lactos	gr i	Lactos q s	(gr iv)
M et ft pulv No 1		M et ft chart No xii	
D t d No XV		Sig One powd every 4 hrs	
Sig One every 2 hrs			
No 3		No 8	
Sod Bicarb	℥i	Hydrarg Chlor Mit	gr ii
Mass Hydrarg	℥i	Sod Bicarb	gr v
M et ft chart No viii		M et ft chart No vi	
Sig One powd every 4 hrs followed by a Seidlitz powder		Sig One powd every 2 hrs	
No 4		No 9	
Bism Subnit	℥i	Mag Ouid Pond	gr lxxx
Phenyl Salicyl	℥ss	Ft pulv No viii	
Carbo Lig	℥ii	Sig One powd in aq $\frac{1}{2}$ hr p c	
M et div in chart No xii			
Sig One t i d		No 10	
No 5		Pulv Ext Bellad	gr i
Mag Ouid	℥i	Acetphen	gr lx
Cret Præp	℥ii	M et ft pulv No xii	
Pil Ext Bellad Fol	gr ii	Sig One powd every 4 hrs	
Ol Menth Pip	gtt iii	No 11	
M et div in pulv No vi		Hydrarg Chlor Mit	gr i
Sig One powd $\frac{1}{2}$ hr p c		Bis Subnit	gr xxx
		M et ft pulv No v	
		Sig One every hr	

In the actual performance of the tests the foregoing prescriptions were filled by the members of the senior class in dispensing pharmacy at the School of Pharmacy of the University of Maryland under working conditions very similar to those prevailing in the better type of pharmacies. It is true that these students were inexperienced in comparison with the average practitioner but it is believed that this lack of experience was offset to a large extent, if not completely by uniformity in measuring and weighing appliances and the close supervision maintained over each operation by the instructors in charge of the work.

For laboratory practice the class in dispensing is divided into sections of approximately 30 students each, and the work of each section is supervised by 4 instructors. Each prescription was filled by the members of at least one section and in some instances by the members of two sections. The completed powders were checked for accuracy with respect to total quantity by weighing on a fairly sensitive balance. No attempt was made in this series of tests to check the amounts of individual ingredients except in the case of prescription No. 1.

The results obtained in these tests are given in the tables which follow. In each case, the standard deviation was computed, and such conclusions as have been drawn are based on the use of this quantity of measurement. Other workers, who have reported tests of this character have stated the results in terms of percentage of deviation from the theoretical amount or from the mean. It seemed however, more to the point to show the closeness with which the individual results are clustered about the mean and as the quantity used for this purpose in works on general

statistics is the standard deviation (S D), it was used in reporting the results of this study. In the derivation of this quantity the generally accepted formula,  $S D = \sqrt{\frac{\sum d^2}{n}}$  was used, in which  $\sum d^2$  represents the sum of the deviations squared, and  $n$  the number of observations made.

#### PRESCRIPTION NO 1

Prescription No 1 was filled by the 'guess by eye method' by one section of the class consisting of 30 students as a part of the regular laboratory work. The fact that the results were to be checked for purposes other than routine grading was not made known. These prescriptions were checked for the weight of individual powders. In addition, 10 batches were selected at random from the 30 batches of 8 powders each and the calomel content of each powder was determined by the assay method given in the U S P X for calomel. The results obtained are given in the Tables I and II.

TABLE I—PRESCRIPTION NO 1 (CORRECT WEIGHT OF EACH POWDER = 5 GRAINS)

Batch No	1	2	Weight of Each Powder in Grains						7	8	Total Wt in Grains	Average Wt in Grains	Standard Deviation
1	4 500	5 000	5 000	4 500	5 500	5 250	5 500	4 375	39 625	4 953	0 423		
2	5 000	5 125	5 125	5 125	5 125	5 250	5 375	4 875	41 000	5 125	0 139		
3	4 750	4 625	5 000	5 250	5 250	4 875	5 375	4 500	39 500	4 937	0 286		
4	4 875	5 250	4 625	4 875	5 000	5 125	5 625	4 625	40 000	5 000	0 312		
5	4 625	5 875	4 875	5 000	5 125	5 625	6 000	4 375	41 500	5 187	0 552		
6	5 500	5 250	5 250	5 125	5 250	5 250	5 750	5 000	42 375	5 296	0 215		
7	4 625	5 000	5 000	5 000	5 000	5 000	5 125	4 500	39 250	4 906	0 204		
8	4 750	4 625	4 875	5 625	4 625	4 625	5 750	4 500	39 375	4 921	0 454		
9	4 875	4 375	5 250	4 875	5 375	4 750	5 625	4 375	39 500	4 937	0 423		
10	5 000	4 500	4 750	5 000	5 250	5 500	5 500	4 500	40 000	5 000	0 167		
11	5 125	4 750	5 000	5 500	5 250	6 000	5 250	4 750	41 625	5 203	0 313		
12	4 500	5 250	4 875	5 000	4 250	5 000	6 000	3 875	38 750	4 843	0 608		
13	4 875	5 625	6 375	5 250	4 875	5 125	5 625	4 625	41 375	5 171	0 341		
14	4 500	4 875	5 125	4 750	5 000	4 500	5 125	4 500	38 275	4 797	0 256		
15	4 750	5 250	4 875	4 625	5 250	5 000	6 000	4 125	39 875	4 984	0 513		
16	5 500	5 000	5 500	5 000	5 125	5 000	4 500	4 250	39 875	4 984	0 407		
17	5 375	5 750	4 750	4 875	4 875	5 000	4 500	4 625	39 750	4 968	0 384		
18	5 625	5 000	4 500	5 125	4 625	4 875	5 250	4 875	39 875	4 984	0 333		
19	4 875	5 625	5 250	5 125	4 625	4 625	5 625	5 250	41 000	5 125	0 369		
20	5 125	5 000	5 000	4 625	5 250	4 750	5 750	4 125	39 625	4 953	0 446		
21	4 875	4 875	4 750	4 875	5 000	5 250	5 375	4 750	39 750	4 968	0 214		
22	4 875	4 875	4 500	4 875	5 000	5 125	5 375	4 875	39 500	4 937	0 234		
23	5 500	4 250	5 250	5 750	4 875	4 750	5 625	4 875	40 875	5 109	0 477		
24	5 750	5 625	5 500	5 125	4 500	5 000	4 750	4 750	41 000	5 125	0 428		
25	5 125	5 250	4 500	5 500	5 500	5 000	4 500	4 750	40 125	5 015	0 377		
26	4 250	4 375	4 625	5 000	5 250	5 375	4 750	5 125	38 750	4 843	0 384		
27	5 000	5 125	4 875	4 500	4 750	4 625	5 250	4 875	39 000	4 875	0 233		
28	5 000	5 000	5 125	4 750	5 250	4 875	5 125	4 875	40 000	5 000	0 153		
29	5 000	5 125	4 500	4 500	4 625	4 750	5 625	4 875	39 000	4 875	0 353		
30	4 875	5 125	4 625	4 875	5 500	4 750	5 125	4 250	39 125	4 890	0 350		

<sup>1</sup> Average S D = 0 345 which is equivalent to an average deviation from the theoretical of 6 90%

It will be observed that in the case of the weight of individual powders, the average standard deviation is 0 345 gr or 6 91% of the prescribed amount. Fourteen of the 30 batches filled fall within the average S D of 0 345 gr while the remaining 16 fall within twice the average S D, or 0 691 gr.



TABLE II — PRESCRIPTION NO 1 (CORRECT PERCENTAGE OF CALOMEL = 40)

Batch No	1	2	Per Cent of Calomel in Each Powder				7	8	Average Per Cent	S D <sup>1</sup>
	3	4	5	6						
1	40 96	35 14	36 36	41 99	41 64	38 05	40 87	39 29	39 29	2 37
2	40 55	46 89	37 06	37 28	39 89	41 56	41 09	40 45	40 59	2 84
3	40 25	40 15	40 05	39 75	39 50	40 30	39 82	40 25	40 01	0 27
4	39 85	39 90	40 12	39 89	40 27	40 15	40 27	39 80	40 03	0 19
5	37 46	37 38	39 60	39 05	37 60	37 83	34 80	40 66	38 05	1 65
6	37 66	42 04	41 32	41 59	39 42	39 67	40 27	39 99	40 24	1 32
7	42 09	40 34	39 79	41 66	40 16	40 16	41 18	41 39	40 85	0 78
8	36 93	36 27	36 24	37 90	36 73	35 67	35 60	34 21	36 19	1 02
9	40 20	40 50	39 32	38 83	39 34	38 43	41 64	32 74	38 87	2 50
10	33 91	39 53	43 07	40 82	39 07	40 15	38 53	38 13	39 15	2 45

<sup>1</sup> Av S D = 1 54 which is equivalent to an average deviation from the theoretical of 3 84%

In the case of the calomel content the average standard deviation amounts to 1 54 or 3 84%, based on a calculated content of 40 per cent Five of the batches assayed for calomel content fall within the average S D while the remaining 5 fall within twice the average S D or within 7 68% of the correct amount

On further examination of Table II it will be observed that the standard deviation for the calomel content in the individual batches of powders is as low as 0 19 and as high as 2 84

The error in the case of calomel content was probably due in greater part to insufficient trituration in the mixing of the ingredients or failure to scrape all of the material from the pestle and sides of the mortar Factors other than these, affecting the results are errors in weighing, loss during transfer and triturating the calomel in a porous mortar before adding the lactose

#### PRESCRIPTIONS NOS 2-11

Prescriptions Nos 2 to 11 were studied with a view to determining to what extent all of the factors heretofore mentioned contribute to the total error The prescriptions filled in this series of tests were selected with the primary objective in view of determining to what extent, if any, the following contribute to the total error number of ingredients, nature of the ingredients number of powders to be made and the amount of material in each powder To secure data to show to what extent the method used in dividing the bulk powder is responsible for the total error, in some of these prescriptions the bulk powder was divided by the 'guess by eye method' in others by the blocking and dividing method and in still others by weighing off quantity for each powder

The finished prescriptions were checked for accuracy of weight of the individual powders only, and the standard deviation was computed from the results obtained Before these prescriptions were given out for filling the students were instructed with respect to the method to be used in dividing the powders and they were told that their work would be checked for accuracy

TABLE III — STANDARD DEVIATION OF PRESCRIPTIONS NOS 2-7

Batch No	Prescriptions					
	No 2	No 3	No 4	No 5	No 6	No 7
1	0 172	0 797	0 305	1 336	0 172	0 371
2	0 241	1 115	0 903	1 425	0 518	0 056
3	0 237	0 605	0 111	0 584	0 260	0 261
4	0 177	0 533	0 226	0 648	0 442	0 310
5	0 158	1 048	0 673	1 342	0 503	0 138
6	0 119	0 162	0 740	0 284	0 500	0 046
7	0 290	0 292	0 711	0 223	0 310	0 116
8	0 219	0 152	0 951	0 218	0 601	0 086
9	0 154	0 140	0 121	0 287	0 228	0 069
10	0 228	0 846	0 579	1 251	0 189	0 063
11	0 128	0 270	0 985	0 861	0 241	0 072
12	0 360	0 697	0 508	1 113	0 165	0 048

13	0 205	0 729	0 217	0 945	0 692	0 067
14	0 169	0 336	0 473	0 351	0 300	0 132
15	0 114	0 863	0 818	1 007	0 241	0 241
16	0 233	0 211	0 072	0 911	0 697	0 180
17	0 140	0 135	0 069	0 226	0 052	0 310
18	0 268	0 460	0 436	0 585	0 036	0 179
19	0 222	0 582	1 180	0 548	0 136	0 275
20	0 115	0 345	1 131	0 530	0 580	0 103
21	0 169	1 025	0 521	0 118	0 276	0 279
22	0 191	0 162	1 043	1 138	0 104	0 276
23	0 069	0 200	0 551	1 190	0 026	0 081
24	0 133	0 787	0 450	0 187	0 513	0 241
25	0 238	0 653	0 830	1 120	0 117	0 210
26	0 128	0 496	0 147	1 027	0 071	0 181
27	0 121	0 330	0 895	0 234	0 117	0 184
28	0 113	1 096	0 582	0 154	0 083	0 352
29	0 191	0 515	0 531	0 374	0 345	0 363
30	0 248	0 168	0 464	0 652	0 314	0 276
Av S D =	0 185	0 525	0 574	0 696	0 294	0 186
Av % =	18 10	5 25	5 30	5 72	13 06	3 72

TABLE IV — STANDARD DEVIATION OF PRESCRIPTIONS NOS 8-11

Batch No	Prescriptions			Batch No	Prescriptions		
	No 8	No 9	No 10		No 8	No 9	No 10
1	0 246	0 041	0 571	31	0 392	0 391	0 448
2	0 473	0 454	0 258	32	0 213	0 496	0 902
3	0 261	0 165	0 560	33	0 212	0 206	0 965
4	0 238	0 066	0 295	34	0 116	0 458	0 985
5	0 239	0 082	0 949	35	0 257	0 019	0 253
6	0 327	1 200	0 643	36	0 062	1 035	0 072
7	0 294	0 647	0 772	37	0 171	0 108	0 177
8	0 471	0 630	0 672	38	0 133	0 454	0 660
9	0 042	1 074	0 604	39	0 232	0 366	0 219
10	0 363	0 901	0 815	40	0 276	0 302	0 794
11	0 132	0 049	0 362	41	0 089	0 605	0 100
12	0 432	0 763	0 240	42	0 387	1 058	0 578
13	0 221	1 158	0 421	43	0 314	0 286	0 502
14	0 133	0 037	0 111	44	0 205	0 940	0 657
15	0 208	1 172	0 645	45	0 198	0 898	0 412
16	0 232	0 520	0 332	46	0 057	0 557	0 252
17	0 152	0 209	0 941	47	0 243	0 319	0 389
18	0 392	0 176	0 797	48	0 199	0 608	0 903
19	0 162	0 435	0 587	49	0 365	0 735	0 860
20	0 151	0 206	0 061	50	0 267	0 829	0 931
21	0 450	0 521	0 885	51	0 085	0 658	0 371
22	0 335	0 529	0 821	52	0 126	0 744	0 689
23	0 306	0 056	0 454	53	0 191	1 081	0 911
24	0 352	0 309	0 485	54	0 086	0 504	0 166
25	0 204	0 829	0 356	55	0 156	0 528	0 326
26	0 161	0 250	0 829	56	0 046	0 629	0 430
27	0 186	0 829	0 560	57	0 112	0 187	0 560
28	0 221	1 175	0 036	58	0 046	0 155	0 615
29	0 227	1 178	0 281	59	0 260	0 082	0 212
30	0 450	0 156	0 243	60	0 151	0 330	0 644
				Av S D =	0 228	0 523	0 526
				Av % =	11 40	5 23	5 26
							5 97

As already stated, the greatest source of error is the division of the bulk powder into individual doses. It may be said further with respect to the methods of filing that the error will be least in those cases in which the powders are divided by weighing. This is shown to be true by the results obtained for prescription No 7, in which the average standard deviation is only 0.186, 17 of a total of 30 batches falling within the average S. D., while the remaining 13 fall within twice the average S. D., and in prescription No 11, in which the average standard deviation is 0.183, 38 of the total of 60 batches falling within the average S. D., 20 within twice the average S. D. and the remaining 2 within three times the average S. D.

When the blocking and dividing method is used, a slight increase in the average standard deviation results. This is revealed by the results obtained for prescription No 8, in which the average standard deviation is 0.228, 35 of a total of 60 batches falling within the average S. D., 23 within twice the average S. D., and the remaining 2 within three times the average S. D., and in prescription No 6, the average standard deviation of which is 0.294, 17 of a total of 30 batches falling within the average S. D., 10 within twice the average S. D. and 3 within three times the average S. D.

The 'guess by eye method' is the least accurate of the methods studied. The results obtained by this method of division are shown in the case of prescription No 1, in which the average S. D. is 0.345, only 14 of a total of 30 batches falling within the average S. D., and the remaining 16 falling within twice the average S. D., or in prescription No 9, in which the average S. D. is 0.523, 33 of a total of 60 batches falling within the average S. D., 19 within twice the average S. D. and 8 within three times the average S. D.

On examination of the results given for prescriptions Nos 9, 3, 4 and 5, it will be observed that the number of ingredients contained in the powder mixture has a slight effect upon the standard deviation. By increasing the number of ingredients the number of operations of weighing and transferring are increased, which in turn results in an increase in the standard deviation. When there is only one ingredient, as in prescription No 9, the average S. D. is 0.523, with two ingredients as in prescription No 3 the average S. D. is 0.525, with three ingredients as in prescription No 4 the average S. D. is 0.574, and with four ingredients, as in prescription No 5 the average S. D. is 0.696.

The nature of the ingredients also plays a part in increasing or decreasing the standard deviation in divided powder prescriptions as shown in prescriptions Nos 1, 5, 10, 6 and 7. The standard deviation for the simple admixture of powders is lower than when the prescription contains a pillular extract or volatile oil in addition to the dry powder. This is to be expected as it is more difficult to weigh a sticky mass such as a pillular extract and completely transfer and incorporate it with other material than if it were a dry powder.

The number of powders dispensed also influences the final result. This is shown in the case of prescriptions Nos 8, 1, 10 and 5, which call for 6, 8, 12 and 15 powders respectively. The average standard deviation in these instances is 0.228, 0.345, 0.526 and 0.696, which shows that the magnitude of the error increases directly with the number of powders made.

The amount contained in each powder has a decided effect on the standard deviation, as well as on the percentage deviation from the theoretical amount, which is shown in the following table.

TABLE V — EFFECT OF SIZE OF INDIVIDUAL POWDER ON STANDARD DEVIATION

Prescription Number	Theoretical Weight of Each Powder in Grains	Average Standard Deviation	Percentage Deviation from the Theoretical
2	1	0.185	18.10
8	2	0.228	11.40
1	5	0.345	6.90
3	10	0.525	5.25
5	12	0.696	5.72

The foregoing data show that the standard deviation increases directly with the weight of the individual powders whereas the percentage deviation from the theoretical amount shows a corresponding decrease. This is to be expected, as a deviation of  $\frac{1}{4}$  grain in a powder weighing 1 grain results in a 25 per cent error, while a deviation of a  $\frac{1}{4}$  grain in a powder weighing 10 grains

results in an error of only  $2\frac{1}{2}$  per cent. The results show further that there is a marked decrease in the error with an increase in weight up to 5 grams where it remains fairly constant. Incidentally, the practical significance of this is that powders divided by the methods other than weighing should be made to weigh a minimum of 5 grains.

The results of the foregoing tests are summarized in Table VI which follows. This table shows, in addition to the actual number of batches of powders falling within the standard deviation and multiples thereof, the percentage of the totals which these constitute. It also shows the grand totals falling within these limits.

(To be continued)

### ASH LIMIT OF DRUGS

L. W. Winkler (*Pharm. Zentrall.* 73 (1932) 593, 612, 705). The drug was first freed from adhering earthy matter, then powdered and passed through a sieve of 5 mm mesh. It was then transferred to a large mortar and stirred for some minutes without pressure from the pestle in order to assist in removal of impurities. This was continued until no foreign particles were distinguishable under a lens. The powder was then dried for one or two days over quicklime.

About 1 Gm. of pure sand was placed in a quartz crucible of 5 cc. capacity and 10 drops of fuming nitric acid were added. After evaporation of the acid, the crucible was heated for five minutes, then cooled on a thick metal plate and weighed when cold. About 0.5 Gm. of the powdered prepared drug was added and the drug and sand thoroughly mixed by means of an iron nail. The crucible and contents were weighed, gently heated until the drug was carbonized and then heated more strongly for five minutes. After cooling, the contents were again carefully mixed with the iron nail in order to break up any large particles of carbonaceous matter and the crucible again strongly heated. After cooling, the contents were again mixed and then 10 drops of fuming nitric acid were added. The acid was evaporated and the crucible heated to redness, cooled and weighed.

In order to ensure complete decomposition of organic matter a further treatment with nitric acid is advocated. The use of powdered oxalic acid as described in the German Pharmacopœia is not recommended since oxalic acid on combustion always gives rise to some carbon.

Figures for about 100 drugs are given in most cases for both the whole and the powdered drug, obtained from two or three different sources.

The ash limits of the German Pharmacopœia seem to be too high, it is suggested that both an upper and a lower limit should be set in future editions, and a table of proposed limits is given. In order to evaluate an unground drug the ash of both the crude drug and the sieved powder should be determined, the difference indicating the amount of earthy matter. The ash of powdered drugs of good quality is not in general greater than that of the cleaned whole drug.

The author suggests that drug houses should always insert the ash limit after the name of the drug, in order to distinguish their goods from inferior grades.—Through *Quarterly Journal of Pharmacy*.

Stabler's  
Pharmacy  
Alexandria, Va.

Mr. Washington desires Mr. Stabler to  
send by the Bureau of the Bureau of  
the Eastern Bell and the American  
the attention  
April 22, 1933

Reproduction from original order to  
Stabler's Pharmacy, Alexandria, Va.—  
Martha Washington

## THE PROFESSIONAL PHARMACY \*

BY FRANK A. DELGADO AND ARTHUR A. KIMBALL, U. S. DEPARTMENT OF COMMERCE

*(Continued from page 693)*

## CHAPTER III. PRESCRIPTION PRICE TRENDS

AVERAGE PRICE OF PRESCRIPTIONS BY TYPE OF PRESCRIPTION IN PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES—CHANGING PRICE TRENDS IN 1910, 1920 AND 1930

Prescription prices in the professional stores in 1930 were somewhat lower than in the commercial stores in every type of prescription except nonnarcotic specialties. The fact that the professional stores filled a larger proportion of prescriptions calling for manufacturers' specialties than the commercial type stores, as shown later in Table XXVIII, and had to keep a wider variety of specialties in stock, is the probable explanation of the higher price for specialty prescriptions.

The showing that average prescription prices were lower in the professional stores will come as a surprise to some readers. It might be thought that professional store prescription prices would be higher than those in commercial type stores for several reasons. For example, the salaries paid the pharmacists or prescription clerks are often higher in professional stores, more prescription equipment is often required and more extensive delivery service is given. But if a pharmacist in a professional store fills five times as many prescriptions each day as one in a commercial type store, the salary cost per prescription in the professional store would be less in spite of the fact that the salary paid per man was higher. Of course, the fact that the pharmacist in the commercial type store also attends to duties in other departments, so that his full salary would not be charged to prescriptions, should be considered. But it probably will be found that the salary cost per prescription is lower in the professional drug store than in the commercial type store. Information concerning operating cost and net profit in the various types of drug stores is now being compiled. When that information is available, the reason for high or low prices will probably be explained.

There is probably a much faster turnover of "staple" prescription items in the professional store, and this would result in lower cost. A possible exception to the fast turnover assumption, manufacturers' specialties, has already been pointed out above, specialties being shown in Table XI to be the only type of prescription for which the professional stores charged higher prices than the commercial type stores. It is probable that in professional stores prescriptions are priced on a more systematic basis, paying more attention to elements of cost, due to the fact that their principal volume is derived from this source.

At any rate, regardless of the reason, the two professional stores studied did charge lower prices for prescriptions than did the commercial type drug stores. This finding is further substantiated in Table XII, which will be discussed later. The prices charged for prescriptions by three other professional stores are shown in that table, and in only one case were they higher than the average for the commercial type stores. However, Stores A and B were inclined to charge lower prices than the other professional stores. Store A has been in business for many years, since long before the War, and perhaps it thus has the inherited and prejudicial tradition of low pre-war prices.

The increase in prescription prices from 1910 to 1920, and from 1920 to 1930 is very interesting. The price increase is found for all types of prescriptions, being considerable in every case. The increase from 1910 to 1920 was much greater than that from 1920 to 1930, the latter, in the case of mixed prescriptions, both narcotic and nonnarcotic, being very small. The only case where a decreased price was found was with official narcotic prescriptions, which were lower in 1930 than in 1920. Perhaps an examination of wholesale prices of narcotic chemicals over this period would explain this showing.

According to figures obtained from the Bureau of Labor Statistics, United States Department of Labor, the value or purchasing power of the dollar in 1910 was \$1.31 and in 1920 only

\* See Table of Contents, page 671, July issue of the JOURNAL. This installment covers Chapters III and IV, which see

\$0.58, if we consider the 1930 dollar to be worth exactly \$1.00. It is interesting to compare the increase in prescription prices over the 20 year period with the fluctuation in the value of the dollar during the same period. The higher purchasing power of the dollar in 1910 is an explanation of the lower average prices in that year. However, the 1930 dollar is worth close to twice as much as the 1920 but during that period, prescription prices increased, but at a much smaller rate than in the preceding 10 years.

In both commercial type and professional drug stores, official prescriptions had the lowest average price and specialties the highest considerably higher than for official prescriptions. Mixed prescriptions were priced about half way between official and special prescriptions.

Of the questionnaire stores, 64.7 per cent have a schedule of prescription prices and 71.8 per cent charge less for prescriptions containing only official ingredients. The proprietors in 80 per cent of the cases reported that they have been able to maintain prescription prices during the depression.

Due to the low average price of prescriptions in 1910, \$0.51 each, it would have taken 1686 prescriptions in 1910 to bring in the same dollar volume that would be brought in by 1000 prescriptions in 1930 at the average price of \$0.86 that year. However, it must be remembered that in 1910, physicians were in the habit of writing more prescriptions. Also, there were fewer drug stores per capita and the cost of operating a pharmacy was less. Therefore, it is probably safe to say that in 1910 prescription business was at least as lucrative as it is to day.

TABLE XI—AVERAGE PRICE OF PRESCRIPTIONS BY TYPE OF PRESCRIPTION IN PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES—PRICES FOR 1910, 1920 AND 1930 IN A PROFESSIONAL DRUG STORE

Type of Prescription	Average Price of Prescriptions			Prescriptions from Commercial Type Stores <sup>2</sup> 1930
	1930	Prescriptions from Professional Stores <sup>1</sup> 1920	1910	
Narcotics				
Official	\$0.81	\$0.84	3	\$0.96
Mixed	0.91	0.87	3	0.98
Specialties	0.91	0.77	3	0.96
Total Narcotics	\$0.85	\$0.84	3	\$0.97
Nonnarcotics				
Official	\$0.73	\$0.66	3	\$0.84
Mixed	0.85	0.82	3	0.93
Specialties	1.04	0.89	3	1.02
Total Nonnarcotics	\$0.86	\$0.76	3	\$0.91
All Regular Prescriptions				
Official	\$0.75	\$0.69	\$0.46	\$0.86
Mixed	0.86	0.83	0.53	0.93
Specialties	1.03	0.88	0.58	1.02
Total All Prescriptions	\$0.86	\$0.77	\$0.51	\$0.92

<sup>1</sup> For the year 1930, these figures are based on the study of 8700 prescriptions from two professional stores. For 1920 and 1910, 1000 prescriptions filed by Store A were analyzed.

<sup>2</sup> These price figures were obtained by the study of 23,963 prescriptions from 13 commercial type drug stores including two chain store units.

<sup>3</sup> These price figures are not available, for the Federal narcotic law was not operative in 1910, so narcotics and nonnarcotics were not distinguished between nor filed separately.

#### MONTHLY PRESCRIPTION PRICE TRENDS IN THREE ADDITIONAL PROFESSIONAL PHARMACIES

The average prescription prices shown in this table were based on the study of a sizable sample of prescriptions for each month of the year in each store. It is interesting to compare these average prices with those shown for two other professional stores in Table XI. While the

average prescription prices in all of these three stores were higher than in the two professional stores reported in Table XI, yet two of these three stores maintained slightly lower prices than the average for commercial type stores, shown in Table XI. Store D, however, priced its prescriptions, both narcotic and nonnarcotic, considerably higher than the other four professional pharmacies, and higher than the average for the commercial type stores. It should be noted that the prescription prices in these three professional pharmacies are based on prescriptions filled during the year 1931, while the prices in Table XI are based on the year 1930, but it is not believed that this fact will make any material difference for purposes of this comparison.

There seems to be no particular trend as to any particular season of the year in which prescription prices were higher. For example, in Store D the average price of narcotic prescriptions is higher during the late fall, winter and early spring months, October through May, while in Store C the price of these prescriptions is highest in the early spring and summer months, March through August. The proprietor of Store C reports that the high average prices of nonnarcotic prescriptions in the summer months were due to a prevalence of gonococcus infections for which certain fairly high priced proprietary preparations are frequently prescribed. He further states that asthmatic and tubercular patients suffer more in the warm months thus requiring more narcotics which when prescribed in larger quantities have a higher average price.

The showing for Store E (a St. Louis professional pharmacy mentioned only in this connection) is very unusual, narcotic prescriptions having an average price considerably lower than nonnarcotics. Due to the extra skill and care which must be used, and risk assumed in filling narcotic prescriptions, it is unusual to find narcotic prescriptions averaging a lower price than nonnarcotics, regardless of the cost of the materials used.

The questionnaire professional stores reported an average price of \$1 each for prescriptions but the average prescription prices ranged among the stores from a low figure of \$0.65 to a high average of \$2.50.

TABLE XII—PRESCRIPTION PRICE TRENDS IN THREE PROFESSIONAL PHARMACIES<sup>1</sup>

Month (1931)	Store C		Store D		Store E	
	Narcotic	Nonnarcotic	Narcotic	Nonnarcotic	Narcotic	Nonnarcotic
Jan	\$0.84	\$0.88	\$1.06	\$0.98	\$0.79	\$0.86
Feb	0.87	0.85	1.02	0.89	0.73	0.87
March	1.00	0.85	1.06	1.00	0.84	0.86
April	1.00	0.84	1.03	0.90	0.75	1.01
May	0.97	0.87	1.14	1.01	0.94	0.90
June	1.20	0.90	0.95	0.97	0.86	0.89
July	1.30	0.94	0.97	1.06	0.85	0.89
Aug	1.05	0.95	0.91	0.91	0.84	0.93
Sept	0.97	0.84	0.88	0.93	0.88	1.04
Oct	0.86	0.92	1.03	0.95	0.88	0.95
Nov	0.92	0.91	0.92	0.97	0.74	0.99
Dec	0.93	0.89	1.00	0.98	0.81	0.87
Average	\$0.99	\$0.89	\$1.00	\$0.96	\$0.82	\$0.92

<sup>1</sup> These prescription prices are based on study of from 34 to 37 narcotic prescriptions and from 198 to 253 nonnarcotic prescriptions in each store for each month.

#### PRICE RANGES OF PRESCRIPTIONS BY TYPE AND NATURE OF PRESCRIPTION

In making the following analysis 8700 prescriptions filled by Stores A and B in 1930 were studied. It will be seen that the most popular price range for both narcotic and nonnarcotic prescriptions was from \$0.75 to \$1.00, inclusive. Slightly more than half of the narcotic prescriptions were priced within this range as compared with 43 per cent of the nonnarcotics. Only 13.5 per cent of the narcotic prescriptions were priced at more than \$1.00 as compared with 17.6 per cent of the nonnarcotics. But, on the other hand, there was a smaller proportion of narcotics priced below \$0.75, than was true for nonnarcotics.

It seems rather surprising, however, to find that 13.87 per cent of the narcotic prescriptions were priced at less than \$0.50, the same being true for only 8.49 per cent of the nonnarcotics. Considering the high cost of narcotic chemicals and drugs and the extra skill and care that must be used and risk that must be taken in filling narcotic prescriptions, it is surprising to find such a large proportion priced at less than \$0.50. In the case of 23,963 prescriptions filled by commercial type drug stores, reported on in the first report concerning the prescription department phase of the survey, only 1.31 per cent of the narcotic prescriptions were priced at less than \$0.50, while about 26 per cent of the narcotic prescriptions were priced at more than \$1.00 by the commercial type stores.

The result of the difference cited above is seen when referring to Table XI, which shows the average price of narcotic prescriptions in Stores A and B to be only \$0.85, less than the \$0.86 average price of nonnarcotic prescriptions. The average price of narcotic prescriptions in the commercial type drug stores studied was \$0.97 as compared with a \$0.91 average price for nonnarcotics.

As seen in Table XII, showing the average prescription prices for Stores C, D and E, narcotic prescriptions averaged \$0.10 higher than nonnarcotics in Store C, and \$0.04 higher in Store D. However, in Store E an unusual condition was found, narcotic prescriptions being priced at \$0.82 and nonnarcotics at \$0.92.

Table XIII also shows the price ranges for official, mixed and specialty prescriptions, under narcotic, nonnarcotic and total regular prescriptions. It is interesting to note the general uni-

TABLE XIII —PRICE RANGES OF PRESCRIPTIONS FILLED BY STORES A AND B IN 1930 BY TYPE OF PRESCRIPTION <sup>1</sup>

Price Range	Official		Mixed		Specialty		All Prescriptions	
	Number	Per Cent Total	Number	Per Cent Total	Number	Per Cent Total	Number	Per Cent Total
<b>Narcotic Prescriptions</b>								
Over \$2.00	20	2.06	11	2.11	3	2.78	34	2.12
\$1.55-\$2.00	28	2.88	20	3.85	7	6.48	55	3.44
\$1.05-\$1.50	48	4.94	60	11.54	19	17.59	127	7.94
\$0.75-\$1.00	484	49.79	298	57.31	36	33.33	818	51.13
\$0.50-\$0.70	212	21.81	107	20.57	25	23.15	344	21.50
\$0.25-\$0.45	180 <sup>1</sup>	18.52	24	4.62	18	16.67	222	13.87
Total	972	100.00	520	100.00	108	100.00	1600	100.00
<b>Nonnarcotic Prescriptions</b>								
Over \$2.00	26	0.87	12	0.64	113	5.08	151	2.13
\$1.55-\$2.00	49	1.64	28	1.49	85	3.82	162	2.28
\$1.05-\$1.50	215	7.18	242	12.86	480	21.59	937	13.20
\$0.75-\$1.00	1267	42.30	968	51.43	819	36.85	3054	43.01
\$0.50-\$0.70	1098	36.66	553	29.38	542	24.38	2193	30.80
\$0.25-\$0.45	340 <sup>2</sup>	11.35	79	4.20	184	8.28	603	8.49
Total	2995	100.00	1882	100.00	2223	100.00	7100	100.00
<b>All Regular Prescriptions</b>								
Over \$2.00	46	1.16	23	0.96	116	4.98	185	2.13
\$1.55-\$2.00	77	1.94	48	2.00	92	3.94	217	2.49
\$1.05-\$1.50	263	6.63	302	12.57	499	21.41	1064	12.23
\$0.75-\$1.00	1751	44.14	1266	52.70	855	36.68	3872	44.51
\$0.50-\$0.70	1310	33.02	660	27.48	567	24.32	2537	29.16
\$0.25-\$0.45	520 <sup>2</sup>	13.11	103	4.29	202	8.67	825	9.48
Total	3967	100.00	2402	100.00	2331	100.00	8700	100.00

<sup>1</sup> Refills are not included among the prescriptions studied.

<sup>2</sup> One narcotic and one nonnarcotic official prescriptions were priced under 25 cents.



formity in the price ranges, regardless of the type of prescription. For all types of prescriptions the most popular price was from \$0.75 to \$1.00 inclusive. Nearly two thirds of the regular prescriptions priced at more than \$2.00 were manufacturers' specialties, specialties also accounting for the largest proportion of the prescriptions priced at from \$1.55 to \$2.00. On the other hand nearly two thirds of the prescriptions priced at less than \$0.50 were official prescriptions. The average cost of materials in each specialty prescription was \$0.45 as compared with \$0.17 for materials in official prescriptions according to a study of the prescriptions in one store. Considering the cost of specialty ingredients, the fact that they were responsible for a large percentage of the high-priced prescriptions is to be expected. Due to the fact that specialties are responsible for a majority of the items occurring only once each in 10,000 prescriptions, as shown elsewhere in the report, perhaps they should bear an even higher mark-up to cover the cost of maintaining items of infrequent occurrence.

PRESCRIPTION PRICE RANGES COMPARED BETWEEN PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES AND FOR PRESCRIPTIONS FILLED IN 1910 AND 1920

The majority of the commercial type drug store prescriptions studied were priced at from \$0.75 to \$1.00. These prescriptions were filled in 1930. The 8,700 professional store prescriptions also filled in 1930 were priced generally lower than those filled in commercial type drug stores although nearly half of the professional store prescriptions were also priced at from \$0.75 to \$1.00. But nearly twice as large a proportion of the professional store prescriptions were priced at less than \$0.75 than in the case of the prescriptions from the commercial type drug stores, with a corresponding decrease in the proportion of prescriptions priced at more than \$0.75. The only exception to this general trend is found in the high priced prescriptions, those priced at more than \$2.00 of which the proportion was twice as high in the professional store prescriptions, due to the fact that rare expensive remedies are more likely to be requested from a professional pharmacy than a commercial type drug store.

The price ranges for prescriptions filled in 1910 and 1920 show an interesting picture. In 1910, nearly half of the prescriptions were priced at less than \$0.50, and 35.5 per cent between \$0.50 and \$0.75. Only about 2 per cent of the prescriptions studied for 1910 were priced at more than \$1.00. It is interesting to compare this with the commercial store prescriptions filled in 1930, where only 2.54 per cent were priced at less than \$0.50 and over 21 per cent at more than \$1.00. This difference is of course due in large part to the difference in the purchasing power of the dollar in 1910 and 1930 as pointed out previously. Also at that time there were not as many high priced specialties being prescribed by physicians who confined their prescriptions more to standard official chemicals and galenicals. The prescription prices in 1920 ranged considerably higher than in 1910, but were not as high as in 1930.

TABLE XIV—PRESCRIPTION PRICE RANGES IN COMMERCIAL TYPE AND PROFESSIONAL DRUG STORES IN 1930 COMPARED WITH PRICE RANGES FOR PRESCRIPTIONS FILLED IN 1910 AND 1920 BY PROFESSIONAL STORE A

Price Range	13 Commercial Type Stores		2 Professional Pharmacies		Store A (1920)		Store A (1910)	
	Number	Per Cent of Total	Number	Per Cent of Total	Number	Per Cent of Total	Number	Per Cent of Total
Over \$2.00	248	1.04	185	2.13	21	2.10	5	0.50
\$1.55-\$2.00	659	2.75	217	2.49	18	1.80	2	0.20
\$1.05-\$1.50	4,256	17.76	1,064	12.23	100	10.00	14	1.40
\$0.75-\$1.00	13,677	57.08	3,872	44.51	351	35.10	139	13.90
\$0.50-\$0.75	4,513	18.83	2,537	29.16	323	32.30	355	35.50
\$0.25-\$0.45	610 <sup>1</sup>	2.54	825	9.48	187 <sup>2</sup>	18.70	485 <sup>4</sup>	48.50
Total	23,963	100.00	8,700	100.00	1,000	100.00	1,000	100.00

<sup>1</sup> Includes 19 prescriptions priced at less than \$0.25

<sup>2</sup> Includes 2 prescriptions priced at less than \$0.25

<sup>3</sup> Includes 8 prescriptions priced at less than \$0.25

<sup>4</sup> Includes 16 prescriptions priced at less than \$0.25

## INCONSISTENCY IN PRESCRIPTION PRICING—PRESCRIPTIONS PRICED BELOW COST

Throughout the entire study of prescriptions filled in commercial type and professional drug stores many inconsistencies in prescription pricing were found. In some stores such inconsistencies were less prevalent than in others, but no store was immune. In certain stores the prescriptions were priced in such a haphazard fashion, that the pricing policy might be said to be one of guesswork. Such a policy is undoubtedly a costly and dangerous one to use. For example, in Store 11-B, a prescription containing cocaine alkaloid and liquid petroleum was priced at \$0.85 although the materials alone cost \$1.45. This did not take into account the cost of the pharmacist's compounding time, or any other cost factors. Such underpriced prescriptions were not a rare occurrence in the stores studied.

Inconsistent pricing also is likely to detract from the good will which a store has built up. If a customer is charged different prices for the same prescription, or finds that another customer is obtaining the same or a similar prescription for a lower price, it is quite likely to create bad feeling toward the store. Of course the price charged is usually noted on the prescription for the pharmacist's guidance in case the prescription is refilled. But if the original price was a matter of guesswork, and did not even cover the cost of materials, every time the prescription was refilled at that price an additional loss would be incurred.

A few minutes taken after filling the prescription and spent in determining the cost of the ingredients used in compounding it, the cost of the time of the pharmacist who filled it, and the other heavy expenses of the prescription department which must be shared by this prescription, would be time well spent. Thus the pharmacist would charge a price which would cover all cost elements and allow a reasonable net profit and which, being determined on a business like basis, would enable the pharmacist to know that his pricing policy was sound, avoiding the possibility of hidden losses and pricing inconsistencies.

One practice which the pharmacist might profitably adopt would be to write the price per ounce on the label of each of his manufacturers' specialty prescription ingredients which are called for most frequently, say the 50 most important specialties. This would take but little time, would save the pharmacist the trouble of looking up the cost of the ingredient at the time he fills a prescription, and would help to eliminate guesswork. The same practice could be followed with the chemicals and galenicals which have the greatest demand. This suggestion is not new, but there are many druggists who have not adopted this practice, who could advantageously do so.

The list below contains examples of inconsistent prescription pricing taken at random from the prescriptions filled by commercial type Store 11-B. They are quite startling when placed side by side on paper, yet occurred frequently in the prescriptions studied in the various drug stores. Of course, in some cases there might be some logical reason for the price discrepancies shown, but as a usual occurrence it would seem strange to charge less for 30 luminal tablets than for 12 of the same tablets. In certain cases the same quantity of a given prescription received different prices, and in other cases the same price was charged seemingly regardless of the quantity.

One interesting example of careless pricing among many was as follows. The pharmacist was accustomed to receive a four ingredient prescription calling for 40 capsules, each capsule containing  $\frac{1}{2}$  grain of luminal. The materials in this prescription cost \$0.67 and \$1.85 was charged for the prescription. Later the pharmacist received an identical prescription except the quantity of luminal was 2 grains per capsule. Without bothering to figure out the cost of materials, the pharmacist charged the same price (\$1.85) that he had charged for the other prescriptions. However the increased amount of luminal ran the cost of materials in the prescription up to \$1.92 and the pharmacist had thus unknowingly charged less than the cost for the prescription.

It seems that the pharmacist experiences a feeling of reluctance bordering on moral cowardice at charging a sufficiently high price when the materials in a prescription require the prescription to be priced at more than one dollar. For example it was noted in one store that the pharmacist charged only \$1.35 each for a number of prescriptions calling for capsules of glandular products such as corpus luteum which had cost him \$1.20. In another case, the pharmacist charged \$1.85 for 30 capsules of a certain specialty, which cost him \$1.50. At least, some pharmacists seem to take it for granted that a price of one dollar more or less will cover the cost and allow a satisfactory profit, but this is by no means true in many cases.

TABLE XV —EXAMPLES OF INCONSISTENT PRESCRIPTION PRICING  
(From Commercial Type Store 11)

Description of Prescription	Quantity	Selling Price	
Luminal Tablets	No 30	\$1 10	1
Identical Prescription	No 12	1 20	
Calcidine Tablets, gr $\frac{1}{3}$	No 50	0 90	2
Identical Prescription	No 20	0 75	
Identical Prescription	No 20	0 50	
Identical Prescription	No 15	0 75	
Capsules Acetyl Sal gr 4, Cod Sulph gr $\frac{1}{3}$ , each capsule	No 15	0 90	3
Identical Prescription	No 15	1 20	
Capsules Quinine Mur gr 3, Luminal gr $\frac{1}{2}$ , Thyroid Ext gr 1, Cascarine gr $\frac{1}{4}$ , each capsule	No 40	1 45	4
Identical Prescription	No 40	1 75	
Identical Prescription	No 40	2 00	
Argyrol Solution 10%	$\frac{1}{2}$ oz	0 35	5
Identical Prescription	$\frac{1}{2}$ oz	0 75	
Identical Prescription	$\frac{1}{2}$ oz	0 90	
Identical Prescription	1 oz	0 35	
S S Potassium Iodide	2 oz	1 25	6
Identical Prescription	2 oz	1 45	
Identical Prescription	2 oz	1 60	
50 Per Cent Solution Potassium Iodide	$\frac{1}{2}$ oz	0 90	7
Identical Prescription	$\frac{1}{2}$ oz	0 75	
An Iron Tonic (Manufacturer's Specialty)	2 oz	1 75	8
Identical Prescription	4 oz	1 00	
Identical Prescription	6 oz	1 35	
Identical Prescription	6 oz	1 35	
Identical Prescription	8 oz	1 35	9
A Reconstructive Tonic (specialty)	2 oz	0 75	
Identical Prescription	3 oz	0 75	
Identical Prescription	4 oz	0 75	
Identical Prescription	4 oz	1 00	10
Elair Terp Hyd and Codeine	3 oz	1 20	
Identical Prescription	4 oz	1 00	
Identical Prescription	4 oz	1 25	
Ephedrine Inhalant	$\frac{1}{4}$ oz	0 90	11
Identical Prescription	1 oz	1 00	
Identical Prescription	1 oz	1 25	
Fluidextract Ergot	1 oz	0 60	12
Identical Prescription	1 oz	1 00	
Identical Prescription	2 oz	1 25	

AVERAGE COST OF MATERIALS AND SELLING PRICE OF PRESCRIPTIONS FILLED IN THREE COMMERCIAL  
TYPE DRUG STORES, BY FORM AND TYPE OF PRESCRIPTION

The facts presented in Tables XVI, XVII and XVIII are a sample of the information being compiled on the cost and net profit phases of the retail prescription business. It should be kept in mind that the average cost figures shown refer only to the cost of the materials used and do not include cost of containers nor any operating expense such as the cost of the pharmacist's time, share of rent, and so forth. The prescriptions considered in these tables were filled in commercial type drug stores 4 C 6 B and 11-B, 3 of the 13 stores studied for the first publication on the prescription department phase of the survey. Store 11 B, with an average charge of \$1.03 for all prescriptions and Store 4-C, with an average prescription price of \$1.02, were two of the highest stores in this respect, the average prescription price for all 13 of the commercial type

drug stores being only \$0.92. This should be kept in mind in studying these tables, but this fact does not detract from the value of the interesting observations brought out by a perusal of the tables. Store 6-B, however, had an average prescription price of only \$0.86.

It is interesting to note that the cost of materials in the average narcotic prescription was less than in the average nonnarcotic prescription in each store. One reason for this is that narcotics are generally prescribed in smaller quantities than are nonnarcotic prescriptions, due to the potency of narcotics and the care with which they must be used. Although most narcotics are very expensive per ounce, such a small fraction of an ounce is prescribed that the cost of the narcotic ingredient is usually small. Also the cost of the nonnarcotic ingredients in the narcotic prescription is often less than in the nonnarcotic prescription, because of the fact that a smaller number of doses is prescribed.

However, it should be noted that there were no specialties among the narcotic prescriptions, which is an important factor in the low average cost of materials in narcotic prescriptions. For example, in Store 11-B the average cost of materials in nonnarcotic prescriptions was bolstered considerably by the 274 specialty prescriptions, which had an average material cost of \$0.45. With specialties excluded, the average cost of materials in nonnarcotic prescriptions in Store 11-B would have been only \$0.20, or \$0.03 less than for narcotic prescriptions.

In costing these prescriptions, it was noted that the price was generally at quite a premium when purchasing in small quantities. For example, pilocarpine hydrochloride cost \$0.46 for 15 grains if purchased in that quantity, but if purchased in  $\frac{1}{8}$  ounce quantities, 57 grains could be purchased for \$0.52. Or, to use an example of an ingredient of more frequent use, acid acetylsalicylic cost \$0.15 an ounce if purchased in that quantity, but only \$0.08 an ounce if purchased in  $\frac{1}{4}$  pound lots. Thus, in most cases an important saving could be made by purchasing in larger quantities. It is wise to purchase no more than necessary of any ingredient of rare occurrence when the extra amount would merely lie idle on the shelves, but with any ingredient which has fairly frequent use, in most cases it would be wise to purchase as large an amount as can be used in a reasonable time to take advantage of the large saving.

The proprietor of Store 11-B was inclined to purchase in very small quantities, smaller than necessary in many cases, thus paying much more for his prescription ingredients than necessary. Thus it was a surprise to find that the average cost of materials in Store 11-B's prescriptions was the same as in Store 6-B, only \$0.26, as compared with \$0.34 in Store 4-C. However, the prescriptions studied for Store 4-C included 740 specialties with their high average material cost of \$0.47, while only 274 specialties are included in the prescriptions filled by Store 11-B. This fact will account for a large part of the difference between the two stores as to cost of materials. (Note also that only 276 specialties were included in the block of prescriptions from Store 6-B.) However, the average cost of materials per prescription was higher in Store 4-C than Store 11-B for every individual type of prescription except mixed prescriptions. Investigation showed, however, that larger average quantities were prescribed in Store 4-C's prescriptions than in the prescriptions filled by Store 11-B. For example, Store 4-C's official nonnarcotic capsule prescriptions called for an average of 20 capsules each, as compared with an average of 17 in Store 11-B. Store 4-C's official narcotic capsule prescriptions called for an average of 26 capsules, as compared with an average of 16 capsules in the same type of prescription in Store 11-B. Store 4-C's official narcotic divided powder prescriptions called for an average of 22 powders as compared with an average of 14 in Store 11-B. Another factor causing the cost of materials to be higher in Store 4-C's prescriptions is that in many more instances than in the case of Store 11-B, the physicians writing Store 4-C's prescriptions prescribed an ingredient under a brand name, rather than under a less expensive U. S. P. or N. F. equivalent.

Some difficulty was encountered in determining cost of materials in the prescriptions studied, due to the fact that it was not possible to tell from the prescription in some cases, the exact ingredient which had been used. For example, if a prescription called for 'acid acetylsalicylic,' was this drug dispensed under its chemical name, costing in pound lots approximately \$0.07 an ounce, or was a manufacturer's branded product costing \$0.81 an ounce used? Similar difficulty was experienced in costing prescriptions calling for luminal, trional, sulphonal and others, the prices of which had a wide range. In the case of luminal, for example, one brand cost \$3.45 a half ounce, and another brand \$2.40 a half-ounce.

In one case the same price was charged for a similar prescription of 30 capsules, whether

acid acetylsalicylic was prescribed under the chemical name or under a brand name. Yet the prescription cost the pharmacist \$0.29 more when he used the branded product. This naturally suggests the question of whether the prescriptions containing the branded product were under priced, or the prescriptions containing the U S P product over priced. It would seem that this is a subject to be weighed very carefully by practicing pharmacists and students of pharmacy. Daily we read of 'get together' meetings held by physicians and pharmacists at which the pharmacists endeavor to interest the physicians in U S P and N F products with their marked price advantage over similar products with coined names. Whether or not pharmacists are successful in their undertaking will depend a great deal on whether or not they can convince physicians that a reasonable share of the savings effected are and will be passed on to the patient.

Another situation which developed in the course of costing prescriptions was a case where a pharmacist, due to the price he was charging for the prescription, was obviously using Pheno barbital U S P, although a trade named equivalent had been prescribed. On inquiry, the pharmacist stated that the physician had authorized him to make this substitution in order to reduce the cost to the patient. The pharmacist thus was able to charge approximately \$1.00 less than would have been necessary if he had used the trade named product. Nevertheless, this is a dangerous practice and may make the pharmacist liable to the manufacturer and lay him open

TABLE XVI -- AVERAGE COST OF MATERIALS AND SELLING PRICE OF 1948 PRESCRIPTIONS FILLED BY COMMERCIAL TYPE DRUG STORE NO. 4 C, BY FORM AND TYPE OF PRESCRIPTION

Prescription Form	Type of Prescription								
	No of Pre scrip tions	Official Average Cost of Mate rials	Average Selling Price	No of Pre scrip tions	Mixed Average Cost of Mate rials	Average Selling Price	No of Pre scrip tions	Specialties <sup>1</sup> Average Cost of Mate rials	Average Selling Price
Liquid	397	\$0.21	\$0.87	368	\$0.30	\$0.95	361	\$0.45	\$1.02
Capsules	236	0.20	1.16	45	0.31	1.08	52	0.28	1.16
Tablets	44	0.24	0.83				232	0.43	1.04
Charts	47	0.08	0.83	9	0.27	0.98	4	0.05	1.13
Ointment	17	0.08	0.71	19	0.11	0.77	23	0.52	0.85
Bulk Powder	8	0.11	0.76	4	0.28	0.98	4	0.55	0.96
Effervescent Salt	2	0.33	0.70				57	0.60	1.20
Pills	4	0.16	0.80				4	0.40	1.04
Suppositories	1	0.20	1.25				2	0.50	0.82
Biological	5	2.19	3.20						
All Others*	1	1.20	0.90				2	0.84	0.90
Total Prescriptions	762	\$0.21	\$0.96	445	\$0.29	\$0.96	741	\$0.47	\$1.05

Prescription Form	Type of Prescription								
	Total Narcotics			Total Nonnarcotics			Total All Prescriptions		
	No of Pre scrip tions	Average Cost of Mate rials	Average Selling Price	No of Pre scrip tions	Average Cost of Mate rials	Average Selling Price	No of Pre scrip tions	Average Cost of Mate rials	Average Selling Price
Liquid	89	\$0.32	\$0.99	1037	\$0.32	\$0.94	1126	\$0.32	\$0.95
Capsules	142	0.28	1.31	191	0.28	1.05	333	0.28	1.16
Tablets	14	0.33	0.88	262	0.40	1.02	276	0.40	1.01
Charts	4	0.12	1.16	56	0.14	0.85	60	0.14	0.87
Ointment	1	0.18	0.75	58	0.26	0.78	59	0.26	0.78
Bulk Powder				16	0.26	0.86	16	0.26	0.86
Effervescent Salt				59	0.60	1.20	59	0.60	1.20
Pills				8	0.28	0.92	8	0.28	0.92
Suppositories				3	0.56	1.23	3	0.56	1.23
Biological				5	2.19	3.20	5	2.19	3.20
All Others*				3	0.96	0.90	3	0.96	0.90
Total Prescriptions	250	\$0.30	\$1.17	1698	\$0.33	\$0.97	1948	\$0.34	\$1.02

<sup>1</sup> There were no narcotic prescriptions among the manufacturers' specialties studied.

\* All others include (1) medicated soap and (2) ampul prescriptions.

TABLE XVII — AVERAGE COST OF MATERIALS AND SELLING PRICE OF 1198 PRESCRIPTIONS FILLED BY COMMERCIAL TYPE DRUG STORE 6 B, BY FORM AND TYPE OF PRESCRIPTION

Prescription Form	Official			Type of Prescription Mixed			Specialties <sup>1</sup>		
	No of Pre scrip tions	Average Cost of Materials	Average Selling Price	No of Pre scrip tions	Average Cost of Materials	Average Selling Price	No of Pre scrip tions	Average Cost of Materials	Average Selling Price
Liquid	366	\$0 19	\$0 77	167	\$0 31	\$0 94	169	\$0 42	\$1 01
Capsules	146	0 17	0 95	70	0 27	0 99	16	0 44	1 17
Tablets	78	0 24	0 71	2	0 12	0 62	69	0 42	0 94
Charts	14	0 04	0 74	3	0 12	1 20	3	0 20	0 77
Ointment	47	0 08	0 53	12	0 21	0 87	4	0 31	0 73
Bulk Powder	16	0 12	0 69				8	0 57	1 03
Effervescent Salt							4	0 60	1 23
Pill									
Suppositories	1	0 20	1 00				2	0 84	1 25
Ampuls							1	1 06	0 90
Total Prescriptions	668	\$0 18	\$0 78	254	\$0 29	\$0 95	276	\$0 43	\$1 00

Prescription Form	Total Narcotics			Type of Prescription Total Nonnarcotics			Total All Prescriptions		
	No of Pre scrip tions	Average Cost of Materials	Average Selling Price	No of Pre scrip tions	Average Cost of Materials	Average Selling Price	No of Pre scrip tions	Average Cost of Materials	Average Selling Price
Liquid	77	\$0 34	\$1 00	625	\$0 26	\$0 85	702	\$0 27	\$0 87
Capsules	76	0 22	0 91	156	0 22	1 00	232	0 22	0 97
Tablets	13	0 46	0 83	136	0 31	0 81	149	0 32	0 82
Charts	4	0 10	0 98	16	0 07	0 77	20	0 07	0 81
Ointment	1	0 47	1 00	62	0 12	0 60	63	0 13	0 61
Bulk Powder				24	0 27	0 81	24	0 27	0 81
Effervescent Salt				4	0 60	1 23	4	0 60	1 23
Pills									
Suppositories	1	0 20	1 00	2	0 84	1 25	3	0 62	1 17
Ampuls	0	0 00	0 00	1	1 06	0 90	1	1 06	0 90
Total Prescriptions	172	\$0 25	\$0 95	1026	\$0 26	\$0 85	1198	\$0 26	\$0 86

<sup>1</sup> There were no narcotic prescriptions among the manufacturers' specialties studied

to the criticism of physicians. If the physician wishes the pharmacist to dispense the official product, he should prescribe it as such.

The reader can himself draw some interesting comparisons between official prescriptions and mixed and specialties, between narcotics and nonnarcotics, and between different prescription forms, so it will not be necessary to point them out in this text. Elsewhere in this report, in Table XXXIV, is presented a summary of Store 6 B's prescription department inventory. It is interesting to compare this inventory summary with Table XVII which shows Store 6 B's average prescription cost and selling prices by form and type of prescription.

#### CHAPTER IV PRESCRIPTION BUSINESS ACCORDING TO THE PHYSICIANS WRITING THE PRESCRIPTIONS

A knowledge of his prescription business, according to the physician writing the prescriptions, is of great importance to the pharmacist who wishes to build his prescription business and to operate it in an efficient manner. An exhaustive study of the prescriptions herein analyzed was made from the point of view of the physicians writing the prescriptions. The date of graduation from medical school, the type of practice and the types of prescriptions prescribed were determined for each physician. Prescriptions filled in 1910, 1920 and 1930 were studied, and the business contributed by particular doctors thus traced over a period of two decades. It is believed that this is the first time that an investigation of this type covering all of these factors has been made. There has been a great deal of conjecture concerning preferences of physicians for official

TABLE XVIII—AVERAGE COST OF MATERIALS AND SELLING PRICE OF 1394 PRESCRIPTIONS FILLED BY COMMERCIAL TYPE DRUG STORE 11-B, BY FORM AND TYPE OF PRESCRIPTION

Prescription Form	Official			Type of Prescription Mixed			Specialties <sup>1</sup>		
	Number of Prescriptions	Average Cost of Materials	Average Selling Price	Number of Prescriptions	Average Cost of Materials	Average Selling Price	Number of Prescriptions	Average Cost of Materials	Average Selling Price
Liquid	485	\$0 20	\$0 95	297	\$0 31	\$1 09	143	\$0 47	\$1 17
Capsules	135	0 11	0 94	61	0 25	1 31	16	0 47	1 36
Tablets	37	0 14	0 96				79	0 43	1 06
Charts	37	0 05	0 80	12	0 08	1 03	6	0 23	1 23
Ointment	27	0 11	0 91	16	0 19	0 98	7	0 36	0 98
Bulk Powder	7	0 20	1 03				5	0 31	0 84
Effervescent Salt							12	0 63	1 18
Pills	3	0 20	1 22				6	0 21	0 76
Suppositories	3	0 81	1 38						
Total Prescriptions	734	\$0 17	\$0 95	386	\$0 29	\$1 12	274	\$0 45	\$1 16

Prescription Form	Total Narcotics			Total Nonnarcotics			Total All Prescriptions		
	Number of Prescriptions	Average Cost of Materials	Average Selling Price	Number of Prescriptions	Average Cost of Materials	Average Selling Price	Number of Prescriptions	Average Cost of Materials	Average Selling Price
Liquid	92	\$0 33	\$1 12	833	\$0 27	\$1 02	925	\$0 27	\$1 03
Capsules	79	0 14	1 07	133	0 20	1 08	212	0 18	1 08
Tablets	15	0 15	1 22	101	0 36	1 00	116	0 33	1 03
Charts	8	0 05	0 91	47	0 08	0 89	55	0 08	0 89
Ointment	3	0 38	1 13	47	0 16	0 93	50	0 17	0 94
Bulk Powder				12	0 27	0 95	12	0 27	0 95
Effervescent Salt				12	0 63	1 18	12	0 63	1 18
Pills				9	0 20	0 91	9	0 20	0 91
Suppositories				3	0 81	1 38	3	0 81	1 38
Total Prescriptions	197	\$0 23	\$1 10	1197	\$0 26	\$1 02	1394	\$0 26	\$1 03

<sup>1</sup> There were no narcotic prescriptions among the manufacturers' specialties studied

U S P and N F preparations as compared with manufacturers' specialties, and as to whether more recent graduates in medicine show a trend toward more frequent use of the latter. This and other questions concerning physicians' habits in prescription writing are answered in this chapter.

A study of prescriptions will usually show that a small number of physicians account for a large part of the prescription business. The pharmacist should be able to "detail" these few leading physicians without great difficulty, and thus cover the source of much of his prescription business. Study of the type of practice of each of his leading physicians and the types of prescriptions most often written by them should be of value to the pharmacist in planning his inventory. (See remarks made in Chapter VI concerning the importance of close contact with the store's leading physicians in promoting simplification of inventory.)

Table XIX shows the importance of a few physicians out of the many who wrote prescriptions filled by professional Stores A and B. In Store A 463 physicians wrote the 5474 prescriptions studied. However, the first 10 physicians (ranked according to the number of prescriptions contributed) wrote 35.3 per cent of the prescriptions studied, an average of 193.1 prescriptions per physician. The source of more than half of this store's prescription business could be covered by "detailing" its 25 leading physicians.

The same situation was found in the case of Store B. The first 10 physicians in this store wrote 42.7 per cent of the prescriptions studied, although they accounted for an average of only 149.3 prescriptions each, due to the fact that a smaller number of prescriptions was studied in this store. This pharmacist could cover 65.8 per cent of his prescription business by contacting the leading 25 physicians.

This same information was obtained for eight commercial type drug stores and published in the first prescription department report from this survey. In the case of a chain store unit, the 10 leading physicians accounted for only 21.02 per cent of its prescription business. But in the other seven commercial type stores, all independent retailers, the 10 leading physicians of each store contributed from 43.75 per cent to 89.25 per cent of the total prescription business.

TABLE XIX—PRESCRIPTION BUSINESS BY PHYSICIANS, GROUPED ACCORDING TO RANK IN NUMBER OF PRESCRIPTIONS WRITTEN

Physicians Considered	Store A			Physicians Considered	Store B		
	Number of Prescriptions Total	Average per Physician	Per Cent of Total Prescriptions		Number of Prescriptions Total	Average per Physician	Per Cent of Total Prescriptions
1-10	1931	193.1	35.3	1-10	1493	149.3	42.7
11-25	1157	77.1	21.1	11-25	809	53.9	23.1
26-50	965	38.6	17.6	26-50	605	24.2	17.3
51-100	641	12.8	11.7	51-100	373	7.5	10.6
101-273	590	3.4	10.8	101-150	111	2.2	3.2
274-463	190	1.0	3.5	151-259	109	1.0	3.1
Total	5474	11.8	100.0	Total	3500	13.5	100.0

<sup>1</sup> Physicians are ranked according to the number of prescriptions each wrote among those studied, the physician writing the greatest number being ranked No. 1, etc.

#### EXTENT TO WHICH PHYSICIANS ARE 'DETAILED' BY THE PHARMACIST

In Stores A and B no regular 'detailing' is undertaken. However, information of interest to physicians in a particular type of practice is passed on to these physicians whenever it comes to the attention of the pharmacists in these stores. Store C 'details' physicians to a considerable extent concerning the store in general and not on any particular types of products. Store D also does considerable 'detailing' on U. S. P. and N. F. preparations, manufacturers' specialties and products of its own manufacture, with particular emphasis on its own products.

Twenty two of the questionnaire professional stores detail physicians concerning U. S. P. and N. F. preparations and specialties, while 13 do not. Twenty nine, or 85.3 per cent of these stores make personal calls on physicians. Fourteen, or 41.2 per cent speak before medical groups.

#### ANALYSIS OF THE PRESCRIPTION BUSINESS OF THE LEADING PHYSICIANS

Table XX gives more detailed information concerning the 10 leading physicians of both Stores A and B. It is interesting to group the physicians according to the length of the time they have practiced to see if the doctors who have graduated in more recent years are inclined to prescribe different types of ingredients than the doctors who have been in practice for a long period of time. If there is any decided difference, or "new school" of physicians, the dividing line can undoubtedly be set at the time of the World War. Thus, all doctors who have graduated since 1917 will be considered as 'post-war' physicians, and those who graduated prior to 1917 will be referred to as 'pre-war' physicians. Differences between the prescriptions of "post-war" and 'pre war' physicians will be pointed out in this chapter whenever such differences are worth noting.

Of Store B's 10 leading physicians, 5 were 'post-war' and 5 'pre war'. Of the 5 "post-war" doctors, 3 prescribed more official prescriptions than specialty prescriptions. In analyzing prescriptions it was found that mixed prescriptions contained more official ingredients than specialty ingredients. This fact should be kept in mind in studying the distribution of prescriptions written by these 10 leading physicians. All of the 5 'pre war' doctors wrote more official prescriptions than specialty prescriptions. In Store A all but 1 of the 10 leading doctors wrote more official prescriptions than specialties, and this doctor wrote more mixed prescriptions than either official or specialty.

It is interesting to note that all but one of Store B's 10 leading physicians either practiced internal medicine or were dermatologists.



TABLE XX —BUSINESS FROM FIRST 10 PHYSICIANS IN 1930

<i>Store A</i>							
Type of Practice	Year of Graduation	Number of Prescriptions	Per Cent of Total Prescription Business	Per Cent of Total Prescriptions Written		Specialties	Private Formula
Internal Medicine	1896	425	7 76	69 9	12 0	17 2	0 9
Dermatology	1921	371	6 78	35 5	39 4	3 0	22 1
Internal Medicine	1911	238	4 35	9 7	39 9	8 4	42 0
Internal Medicine	1923	195	3 56	44 6	39 5	15 9	
Internal Medicine	1927	176	3 22	49 4	19 3	29 6	1 7
Genito Urinary	1909	118	2 16	30 5	39 8	29 7	
Ophthalmology	1904	117	2 14	88 0	9 4	2 6	
General Practice	1896	102	1 86	30 4	35 3	34 3	
Ophthalmology	1912	96	1 75	60 4	29 2	10 4	
Ophthalmology	1908	93	1 70	83 9	14 0	2 1	
Total		1931	35 28	48 2	27 9	14 1	9 8
Total Not Including Private Formula Prescription							
		1742	33 69	53 5	30 9	15 6	

<i>Store B</i>						
Type of Practice	Year of Graduation	Number of Prescriptions	Per Cent of Total Prescription Business	Per Cent of Total Prescriptions Written		
Internal Medicine	1918	398	11 37	33 2	23 6	43 2
Internal Medicine	1896	193	5 52	74 6	14 0	11 4
Dermatology	1909	162	4 63	56 1	23 5	20 4
Internal Medicine	1919	149	4 26	33 6	25 5	40 9
Internal Medicine	1925	123	3 51	46 3	11 4	42 3
Dermatology	1900	114	3 26	34 2	56 2	9 6
Internal Medicine	1894	97	2 77	55 7	16 5	27 8
Ear Nose and Throat	1922	91	2 60	39 5	40 7	19 8
Dermatology	1906	83	2 37	48 2	32 5	19 3
Dermatology	1928	83	2 37	25 3	55 4	19 3
Total		1493	42 66	44 5	26 9	28 6

Professional Store A has been in existence for a considerable period of time, and it was therefore considered of interest to examine some prescriptions filled in previous decades in order to see what, if any, changes have taken place in the passing years. Accordingly, 1000 prescriptions filled in 1910 and 1000 filled in 1920 were examined, and the results of this study, in so far as they regard the physicians writing them, are presented in two tables below.

In Table XXI it will be seen that the 10 leading physicians in 1910 accounted for 54 per cent of the 1000 prescriptions studied, a considerably higher proportion than that accounted for by the first 10 physicians in 1920 and 1930. Detailed information is given in this table for the first 15 doctors. Of these 15 doctors, 10 were recent graduates in 1910 at that time having practiced no more than 15 years. As of interest in showing the extent to which the same doctors remain important to a store's prescription business, the rank of these 15 doctors in 1920 and 1930 is shown, whenever they were still contributing prescriptions in those years. For example, the leading doctor in 1910 ranked third in 1920 and in 1930 after 60 years of practice was still a valuable contributor, ranking forty first and writing 33 of the prescriptions filled by professional Store A in that year. Again the doctor who ranked 13th in 1910 and who was at that time a recent graduate ranked first in both 1920 and 1930, contributing 425 prescriptions in the latter year. On the other hand, another recent graduate in 1910 who ranked second in that year and fourth in 1920, became relatively unimportant to the store's prescription business in 1930 when he contributed only two prescriptions.



doctors in Store B, 55 prescribed more official prescriptions than specialties, 15 more specialties than official and 17 an equal number of each kind

TABLE XXIII — TYPES OF PRESCRIPTIONS WRITTEN BY "POST WAR" AND "PRE-WAR" PHYSICIANS

Physicians Considered	Store A <sup>1</sup>					
	Type Most Often Prescribed					
	Official Number of Doctors	Per Cent of Total	Mixed and Specialties Number of Doctors	Per Cent of Total	Tie Number of Doctors	Per Cent of Total
Post war" Doctors (124)	55	44 4	55	44 4	14	11 2
' Pre war" Doctors (260)	139	53 5	103	39 6	18	6 9
Unknown (79)	36	45 6	35	44 3	8	10 1
Total (463)	230	49 7	193	41 7	40	8 6

Store B <sup>1</sup>						
'Post war ' Doctors (84)	44	52 4	34	40 5	6	7 1
' Pre war" Doctors (145)	74	51 0	57	39 3	14	9 7
Unknown (30)	13	43 3	15	50 0	2	6 7
Total (259)	131	50 6	106	40 9	22	8 5

<sup>1</sup> Private formula prescriptions not included in this table

A more detailed picture of the preference of "pre-war" and "post war" physicians for official remedies as opposed to mixed and specialties is presented in Table XXIV. The doctors are shown in groups according to their rank in the number of prescriptions written by each. The extent of the preference for official prescriptions, or for mixed and specialty prescriptions, is also

TABLE XXIV — PREFERENCE OF LEADING PHYSICIANS FOR OFFICIAL OR MIXED AND SPECIALTY PRESCRIPTIONS

Store A												
Type of Prescriptions Written	Doctors Considered <sup>1</sup>											
	First 25 Post war	Pre war	Post war	26-50 Pre war	Un known	Post war	51-100 Pre war	Un known	Total Post war	First 100 Pre war	Un known	Total
100% Official	0	0	0	0	0	0	0	0	0	0	0	0
75% Official	0	3	1	1	0	1	8	0	2	12	0	14
About Even	5	15	1	13	1	8	19	3	14	47	4	65
75% Mixed and Specialties	0	2	3	5	0	3	5	1	6	12	1	19
100% Mixed and Specialties	0	0	0	0	0	0	2	0	0	2	0	2
Total	5	20	5	19	1	12	34	4	22	73	5	100

Store B												
Type of Prescriptions Written	Doctors Considered <sup>1</sup>											
	First 25 Post war	Pre war	Post war	26-50 Pre war	Post war	51-100 Pre war	Un known	Total Post war	First 100 Pre war	Un known	Total	
100% Official	0	0	1	0	4	0	1	5	0	1	6	
75% Official	2	4	1	7	3	4	0	6	15	0	21	
About Even	8	9	5	9	10	17	0	23	35	0	58	
75% Mixed and Specialties	1	1	2	0	2	5	2	5	6	2	13	
100% Mixed and Specialties	0	0	0	0	0	2	0	0	2	0	2	
Total	11	14	9	16	19	28	3	39	58	3	100	

<sup>1</sup> The doctors considered are the first 100 in order of importance

It is interesting to note the change in the types of practice of the leading physicians from 1910 to 1930, as this change undoubtedly caused different ingredients and types of prescriptions to be in greatest demand in the different years. Thus the pharmacist should keep himself informed as to his leading physicians, their types of practice and the types of prescriptions and ingredients most frequently prescribed by them in order that his basic prescription department stock can be molded to conform with this changing demand.

Table XXII gives detailed information for the 20 leading doctors in 1920. It will be seen that the 10 leading doctors in 1910 accounted for about the same proportion of the total prescriptions studied as did the 20 leading physicians in 1920. In 1910, 129 physicians wrote the 1000 prescriptions studied while 178 doctors wrote the 1000 prescriptions studied for 1920. In all three years 1910, 1920 and 1930 a small number of physicians accounted for a large proportion of the total prescription business. All of the first 10 doctors in 1920 had then been in practice for a considerable period, and this was also true of 8 of the second 10 doctors in 1920.

#### PREFERENCE OF PHYSICIANS FOR OFFICIAL OR SPECIALTY REMEDIES

Table XXIII shows the division of the physicians writing the prescriptions studied according to the preponderance of official or mixed and specialty prescriptions among the prescriptions each wrote. The primary purpose in making this tabulation is to verify, if true, the accuracy of the statement so frequently made to the effect that physicians who have graduated since the World War write largely prescriptions calling for specialties, not being taught therapeutics, materia medica and pharmacology to the same extent that physicians graduating before the War were, and thus are more susceptible to the 'detail' men representing manufacturers of proprietary specialties. It is well known that these manufacturers have increased in number and their promotional effort multiplied several times. They not only 'detail' physicians by sending representatives to call, but they advertise a great deal in medical journals, and mail physicians a considerable amount of literature and samples. In view of these facts, it would not have been surprising to have found the above mentioned statement verified.

However the facts in the following table show that both 'post-war' and 'pre-war' physicians had a preference for official remedies, although 'post-war' physicians had a tendency to mix official ingredients with specialties more than the 'pre-war' physicians did. This latter tendency may be due to the possibility that pre-war physicians are more familiar with official elixirs and syrups used as vehicles and suspension agents, whereas doctors who have graduated in more recent years may be more likely to write for a proprietary form of the same preparation the proprietary name usually being shorter and easier to pronounce and spell. Considering the funds spent and promotional effort put behind proprietary specialties as compared with official preparations the fact that both groups of physicians showed a preference for the official form is quite flattering to the official type.

There seems to be little indication that "pre-war" doctors prescribe official remedies to a greater extent than 'post-war' doctors. In Store A a higher percentage of 'pre-war' doctors than 'post-war' doctors leaned toward official prescriptions, but this was reversed in Store B. In Store A 53.5 per cent of the 'pre-war' doctors prescribed more official remedies than mixed and specialties combined but this was true for only 44.4 per cent of the 'post-war' doctors. In Store B however, 52.4 per cent of the 'post-war' physicians favored official preparations, while the same was true for only 51 per cent of the 'pre-war' doctors. In quite a few cases the number of official prescriptions of a physician exactly equalled the combined number of mixed and specialty remedies prescribed, so these doctors were listed under the heading "tie."

In the following table mixed and specialty prescriptions have been considered together and compared with official prescriptions, so that the demand for purely official prescriptions can be seen. It should be remarked however that more than half of the ingredients contained in the mixed prescriptions were official ingredients, so the demand for official ingredients is even greater than this table would indicate. This will be seen later in this report where the total number of occurrences of official ingredients and specialty ingredients is shown. For example, if mixed prescriptions are eliminated from consideration in Store B, it is found that of the 55 leading 'post-war' doctors, 35 prescribed more official prescriptions than specialties, 15 prescribed more specialties than official and 5 prescribed an equal number of each. Of the 87 leading 'pre-war'

doctors in Store B, 55 prescribed more official prescriptions than specialties, 15 more specialties than official and 17 an equal number of each kind

TABLE XXIII—TYPES OF PRESCRIPTIONS WRITTEN BY "POST-WAR" AND "PRE WAR" PHYSICIANS

Physicians Considered	Store A <sup>1</sup>					
	Type Most Often Prescribed					
	Official Number of Doctors	Per Cent of Total	Mixed and Specialties Number of Doctors	Per Cent of Total	Tie Number of Doctors	Per Cent of Total
Post war" Doctors (124)	55	44 4	55	44 4	14	11 2
Pre war" Doctors (260)	139	53 5	103	39 6	18	6 9
Unknown (79)	36	45 6	35	44 3	8	10 1
Total (463)	230	49 7	193	41 7	40	8 6

Store B <sup>1</sup>						
' Post-war" Doctors (84)	44	52 4	34	40 5	6	7 1
' Pre-war" Doctors (145)	74	51 0	57	39 3	14	9 7
Unknown (30)	13	43 3	15	50 0	2	6 7
Total (259)	131	50 6	106	40 9	22	8 5

<sup>1</sup> Private formula prescriptions not included in this table

A more detailed picture of the preference of "pre war" and "post-war" physicians for official remedies as opposed to mixed and specialties is presented in Table XXIV. The doctors are shown in groups according to their rank in the number of prescriptions written by each. The extent of the preference for official prescriptions, or for mixed and specialty prescriptions, is also

TABLE XXIV—PREFERENCE OF LEADING PHYSICIANS FOR OFFICIAL OR MIXED AND SPECIALTY PRESCRIPTIONS

Type of Prescriptions Written	Store A											
	Doctors Considered <sup>1</sup>											
	First 25 Post war	Pre war	26-50 Post war	Pre war	Un known	Post war	51-100 Pre war	Un known	Total Post war	First 100 Pre war	Un known	Total
100% Official	0	0	0	0	0	0	0	0	0	0	0	0
75% Official	0	3	1	1	0	1	8	0	2	12	0	14
About Even	5	15	1	13	1	8	19	3	14	47	4	65
75% Mixed and Specialties	0	2	3	5	0	3	5	1	6	12	1	19
100% Mixed and Specialties	0	0	0	0	0	0	2	0	0	2	0	2
Total	5	20	5	19	1	12	34	4	22	73	5	100

Type of Prescriptions Written	Store B											
	Doctors Considered <sup>1</sup>											
	First 25 Post war	Pre war	26-50 Post war	Pre war	Un known	Post war	51-100 Pre war	Un known	Total Post war	First 100 Pre war	Un known	Total
100% Official	0	0	1	0	4	0	1	5	0	1	6	6
75% Official	2	4	1	7	3	4	0	6	15	0	21	21
About Even	8	9	5	9	10	17	0	23	35	0	58	58
75% Mixed and Specialties	1	1	2	0	2	5	2	5	6	2	13	13
100% Mixed and Specialties	0	0	0	0	0	2	0	0	2	0	2	2
Total	11	14	9	16	19	28	3	39	58	3	100	100

<sup>1</sup> The doctors considered are the first 100 in order of importance

shown Only the 100 leading doctors in each store are considered, for only these doctors wrote enough prescriptions among those studied to show a possible trend

From this table it would seem that there is no marked tendency for "pre-war" physicians to prescribe a greater proportion of official remedies than do "post-war" physicians For example in the case of Store B, 15 of the "pre-war" doctors prescribed official remedies at least 75 per cent of the time, while 8 other "pre-war" doctors prescribed mixed or specialties 75 to 100 per cent of the time On the other hand, 11 "post-war" physicians prescribed official remedies 75 to 100 per cent of the time, while 5 other "post-war" doctors prescribed mixed or specialty remedies in 75 per cent of their prescriptions studied

In Store A 14 physicians leaned heavily toward official prescriptions, while 21 other physicians wrote mixed or specialty prescriptions most of the time However, in Store B, 27 physicians wrote official prescriptions at least 75 per cent of the time, and only 15 physicians showed a similar decided preference for mixed and specialties combined Of the 27 physicians who preferred official prescriptions, 6 wrote official prescriptions in every instance and 5 of these 6 doctors were "post-war" physicians

#### PREScription BUSINESS BY TYPE OF PRACTICE OF THE PHYSICIANS WRITING THE PRESCRIPTIONS

The table below shows the prescription business of two professional pharmacies according to the type of practice of the contributing physicians In both stores, those physicians who practiced internal medicine predominated, but particularly so in Store B where doctors practicing internal medicine represented 44.4 per cent of the total number of contributing doctors and wrote 50.2 per cent of the prescriptions studied

It is interesting to note the major types of practice of the doctors contributing prescriptions to these two stores Twelve major types of practice are shown However, the primary reason for including this table is to show the effect of the different types of practice on the demand for official prescriptions as compared with mixed and specialties Slightly more than half of the total

TABLE XXV—PRESCRIPTION BUSINESS BY TYPE OF PRACTICE OF THE PHYSICIANS WRITING THE PRESCRIPTIONS OF TWO PROFESSIONAL PHARMACIES<sup>1</sup>

Type of Practice	Physicians		All Prescriptions		Prescriptions Written				Specialties	
	Num ber	Per Cent of Total	Num ber	Per Cent of Total	Official Num ber	Official Per Cent	Mixed Num ber	Mixed Per Cent	Num ber	Per Cent
Internal Medicine	153	32.8	3072	36.87	1627	53.0	658	21.4	787	25.6
Ophthalmology	42	9.0	997	11.96	633	63.5	255	25.6	109	10.9
Dermatology	13	2.8	889	10.67	401	45.1	385	43.3	103	11.6
General Practice	70	15.0	879	10.55	364	41.4	233	26.5	282	32.1
Ear, Nose and Throat	42	9.0	727	8.72	449	61.8	142	19.5	136	18.7
Surgery	32	6.9	552	6.62	282	51.1	88	15.9	182	33.0
Gynecology	30	6.4	333	4.00	144	43.3	64	19.2	125	37.5
Pediatrics	26	5.6	246	2.95	157	63.8	58	23.6	31	12.6
Genito-urinary	12	2.6	196	2.35	55	28.1	60	30.6	81	41.3
Neurology	11	2.4	157	1.88	80	50.9	48	30.6	29	18.5
Cardiology	5	1.1	134	1.61	61	45.5	29	21.7	44	32.8
Diagnostics	2	0.4	77	0.93	37	48.0	27	35.1	13	16.9
All Others <sup>2</sup>	28	6.0	74	0.89	35	47.3	21	28.4	18	24.3
Total	466	100.0	8333	100.00	4325	51.9	2068	24.8	1940	23.3

<sup>1</sup> For Store A all physicians writing 3 or more prescriptions each are included in this table plus 13 physicians writing only 2 prescriptions each but for whom it was possible to ascertain the type of practice For Store B, all of the 259 physicians writing the prescriptions studied are included in this table

<sup>2</sup> Includes 14 doctors whose type of practice is unknown but who together wrote 37 of the prescriptions studied one surgeon and pathologist writing 13 of the prescriptions, a roentgenologist and a proctologist each writing five prescriptions, a pathologist an orthopedic surgeon a neurologist psychologist and an obstetrician each writing 2 prescriptions two dentists an endocrinologist, an orthopedic surgeon a pathologist and a proctologist each writing one prescription

<sup>3</sup> Private formula prescriptions not considered in this table

number of prescriptions were official, with the remaining number about equally divided among mixed and specialties. Thus there were more than twice as many official prescriptions as specialties, and for every individual type of practice except genito urinary there were more official than specialty prescriptions. This same situation was true for both stores when considered individually.

#### LEGIBILITY OF PRESCRIPTIONS

As pointed out in the report concerning 13 usual commercial type drug stores, prescriptions can be much more efficiently filled if they are written in a good legible hand. Delay, which the customer generally blames on the pharmacist, at times occurs while the pharmacist attempts to get in touch with the prescribing physician to get a translation of a poor specimen of handwriting. Mistakes may easily occur through poor penmanship where two ingredients are fairly alike in name.

In the 13 commercial drug stores, only 3.1 per cent of the prescriptions studied were rated 'poor' as to legibility, and the highest proportion of prescriptions with poor legibility for an individual store was 6.3 per cent. It was thought that the above showing for commercial stores was very unfortunate, but the proportion of prescriptions with poor legibility in these professional stores is even higher than the most unfortunate showing for a commercial store.

It would seem from the showing in professional Store A that physicians are less particular about their handwriting to day than they were two decades ago, although the situation is not quite as bad in that store as it was in 1920. There are a number of ways in which this situation can be remedied. Druggists' associations can contact with physicians through their medical associations, pointing out the advantages which will come to all parties if the physicians will use a little more care in writing prescriptions. The druggist can also 'detail' his leading physicians, that small group of doctors who account for a majority of his prescription business, and tactfully put the matter before them, thus obtaining immediate remedial results, in case any of these leading doctors are offenders as to poor penmanship. One manufacturer of specialties with a house organ mailed to physicians has already placed a notice in his publication cautioning physicians to write prescriptions carefully.

TABLE XXVI—LEGIBILITY OF PRESCRIPTIONS

Store and Date	Degree of Legibility of Prescriptions					
	Good		Fair		Poor	
	Number of Prescriptions	Per Cent of Total	Number of Prescriptions	Per Cent of Total	Number of Prescriptions	Per Cent of Total
Store A (1910)	245	24.5	722	72.2	33	3.3
Store A (1920)	149	14.9	767	76.7	84	8.4
Store A (1930)	1364	24.8	3763	68.4	373	6.8
Store B (1930)	790	22.6	2420	69.1	290	8.3

#### THE PROBLEM OF PHYSICIANS' ERRORS IN PRESCRIPTION WRITING

Quite occasionally while studying the prescriptions filled by the various test stores a prescription was found which quite obviously could not be filled as written. For example, the following is a copy of an actual prescription of this type: Potassium iodide, 2 drams, water, 3 ounces, "Kasagra" 2 ounces, and lithated sorghum compound, quantity sufficient to make 4 ounces. Obviously either a larger total quantity was intended or a smaller quantity of one of the other ingredients. In this case probably the physician intended to prescribe only 3 drams of water. In some cases, however, it was very difficult to determine just what was intended. The pharmacist had undoubtedly called up the physician to determine what he intended to prescribe, and then had filled the prescription correctly but had failed to note the correction on the prescription. Thus, the pharmacist had no record of the way in which the prescription was filled for his own protection and convenience in case of a refill. In case the prescription was brought in to be refilled, the pharmacist would either have to call up the physician again, or rely on his memory for the correction which is not an absolutely safe procedure. Yet a considerable number of such prescriptions were found without any correction noted on the prescription.

Some prescriptions were found which, as a physical possibility, could have been filled as written but which contained an improper dose of a certain ingredient. For example, one actual prescription called for the following: Acetyl salicylic acid, 4, codeine sulphate, 3—capsules No

15 The physician writing this prescription evidently meant to prescribe "codeine sulphate 3," as one sixth of the amount he actually prescribed per capsule would be a large dose. In this and other such cases the correction was not noted on the prescription. Of course, being a narcotic, there was no question of refills, but for the pharmacist's own protection, particularly in the case of a narcotic prescription he should have noted the correction on the prescription.

Incidentally the prescription just given as an example, which could have been filled as written, but which if filled as written might have caused serious harm to the patient if no correction had been made, is an example of the skill, knowledge and experience which the pharmacist must use in filling prescriptions. His work does not consist merely of counting out pills, or pouring liquids from one bottle to another. In addition to the many difficult prescriptions which must be compounded the pharmacist must have a thorough knowledge of the therapeutic use, effect and dosage of the many hundreds of prescription ingredients which he carries in stock, and must be ever alert to notice errors in prescriptions. No matter how careful physicians are, there are bound to be a certain number of errors in prescription writing, and the trained pharmacist is an additional safeguard in seeing that the patient gets what the physician intended.

*(To be continued next month)*

### DIGITALIS IN PHARMACY

On page 594 of the July JOURNAL a display of Digitalis graphically portrays fields of fox glove, the processing building with the furnace, drying room and cupboards, cleaning machinery and mill for grinding the dried cleaned leaf to a powder. The exhibit further includes display bottles showing the drug in different stages including the tincture and other products.



Digitalis was selected as a suitable drug for a demonstration of the way in which a common plant is turned to pharmaceutical and medical uses. F. A. Upsher Smith of Minneapolis cooperated with the committee in designing and preparing the digitalis display, which is a very interesting part of the exhibit and a credit to pharmacy.



# THE DEPARTMENT OF THE NATIONAL ASSOCIATION OF BOARDS OF PHARMACY

*President* A L I Winne Richmond Va *Treasurer*, J W Gayle, Frankfort, Ky *Chairman of Executive Committee* H M Lerou Norwich, Conn *Secretary*, H C Christensen, 130 N Wells St Chicago, Ill

## ACTIVE MEMBER STATES

Alabama	Indiana	Montana	Rhode Island
Alaska	Iowa	Nebraska	South Carolina
Arizona	Kansas	Nevada	South Dakota
Arkansas	Kentucky	New Hampshire	Tennessee
Colorado	Louisiana	New Jersey	Texas
Connecticut	Maine	New Mexico	Utah
Delaware	Maryland	North Carolina	Vermont
D of Columbia	Massachusetts	North Dakota	Virginia
Florida	Michigan	Ohio	Washington
Georgia	Minnesota	Oklahoma	West Virginia
Idaho	Mississippi	Oregon	Wisconsin
Illinois	Missouri	Pennsylvania	Wyoming
		Porto Rico	

## PROGRAM OF THIRTIETH ANNUAL CONVENTION

NATIONAL ASSOCIATION BOARDS OF PHARMACY, AUGUST 28 AND 29, 1933,  
HOTEL LORAIN, MADISON, WIS

### MONDAY, AUGUST 28TH, 9 30 A M — *First Session*

- 1 Call to Order President Allan
- 2 Roll Call
- 3 Appointment of Committee on Credentials President Allan
- 4 President's Address, Clare F Allan
- 5 Appointment of Committee on President's Address
- 6 Report of Executive Committee, J A J Funk *Chairman*
- 7 Report of Secretary, H C Christensen
- 8 Report of Treasurer J W Gayle
- 9 Presentation of Amendments to Constitution and By Laws Duncan Weaver, *Chairman*
- 10 Paper "Accuracy in Compounding as Shown by State Board Examinations," Robert L Swan

### MONDAY, AUGUST 28TH 1 30 P M — *Second Session*

- 1 Report of Legislative Committee, Wm S Denton, *Chairman*
- 2 Second Roll Call
- 3 Appointment of Nominating Committee, President Allan
- 4 Report of Advisory Examination Committee, H C Christensen, *Chairman*
- 5 Report of Syllabus Committee, A L I Winne
- 6 Report of Committee on National Legislation, James W Wise, *Chairman*
- 7 Report of Committee on Pharmacy Ownership Law, Geo W Mather *Chairman*
- 8 Report of District No 1, C Thurston Gilbert, *Vice President*
- 9 Report of District No 2, Robert P Fischelis, *Vice-President*
- 10 Report of Committee on Banquet Arrangements, O Rennebohm, *Chairman*

MONDAY AUGUST 28TH, AT 6 00 P M—*N A B P Banquet*

TUESDAY AUGUST 29TH, 9 00 A M—*Joint Session with American Association of Colleges of Pharmacy*

- 1 Report of Fairchild Scholarship Committee, E G Eberle, *Chairman*
- 2 Paper 'Is Compulsory Apprenticeship Registration Working a Hardship on Young Men Entering Pharmacy?' C B Jordan, R W Sterling
- 3 Resolutions from District Meetings A F Schlichting, A C Taylor

TUESDAY, AUGUST 29TH, 2 30 P M—*Final Session*

- 1 Report of Department of Education, R L Swain *Director*
- 2 Report of Committee on President's Address
- 3 Report of Publicity Committee F D Pierce, *Chairman*
- 4 Report of Committee on Prerequisite Legislation, W R Acheson, *Chairman*
- 5 Report of Grievance Committee A H King, *Chairman*
- 6 Final Report of Credentials Committee
- 7 Report of Resolutions Committee A C Taylor, *Chairman*
- 8 Report of Committee on Constitution and By-Laws Duncan Weaver *Chairman*
- 9 Reports of Special Committees
- 10 Unfinished Business
- 11 New Business
- 12 Report of Nominating Committee
- 13 Election and Installation of Officers
- 14 Adjournment

## COMMITTEE REPORTS

### REPORT OF SUB-COMMITTEE ON DIGESTIVE FERMENTS AND GLANDULAR PRODUCTS \*

Three subjects were studied during the past year whole pituitary substance, trypsin and rennin

#### WHOLE PITUITARY POWDER

It will be recalled that at last year's meeting, a report was made on the oxytocic activity of whole pituitary powder, and that it was voted to re assay the composite sample this year as well as to prepare and assay a new composite

This has been done The composite was prepared, as was last year's by thoroughly mixing equal weights of whole pituitary powder donated by Armour & Co, Digestive Ferments Co, Eli Lilly & Co, Parke, Davis & Co and The Wilson Laboratories

The method of preparing the solution for assay by the collaborators was the same as that used last year

It was requested that last year's composite sample be re assayed to ascertain if it had lost any activity

The results are as follows

#### WHOLE PITUITARY POWDER

Lab	1933 Sample	1932 Sample Assayed 1932	1932 Sample Assayed 1933
1	160	90	90
2	125	89	87
3	120	80	80
4	125		80
5		65	65
6	150	100	89
Average	136	85	80

All figures are expressed in international units per Gm

\* Presented at the Twenty-Second Annual Meeting of the American Drug Manufacturers Association held at Hot Springs Virginia, May 8-11, 1933

From the table, it will be seen that the 1933 composite is considerably stronger than the 1932 the average being 136 international units per Gm. as against 85 units for the 1932 composite, as reported last year.

The average of the 1932 composite assayed in 1933 was 80 units as against 85 units last year. Four laboratories report practically identical results for the two years, and the only large variation was that of Laboratory 6. From this it may be concluded that the 1932 composite has not lost any oxytocic activity in one year.

Why the 1933 composite should be so much stronger than the 1932 is not apparent. Last year, it was agreed to adopt tentatively a value of 75 international units per Gm. In the light of this year's work, it may be desirable to revise this figure. Furthermore, a 1934 composite would add valuable information, as to the variations in strength that could be expected.

The values found by the different laboratories are in excellent agreement considering the nature and limitations of the method. This agreement is due, for the most part, to the use of a standard pituitary powder as a basis of comparison. Without such a standard it is doubtful if the results would agree so closely. This is an example of the utility of a standard sample, where the method of assay *per se* is subject to wide variations.

It is recommended that

1. A 1934 composite whole pituitary powder be prepared and assayed.
2. The 1932 composite be re-assayed to determine its further keeping qualities.
3. The definition for whole pituitary powder adopted last year be tentatively changed to read as follows:

Whole pituitary powder derived from cattle, swine or sheep, shall contain not less than 100 international units per Gm.

#### TRYPSIN

Last year an A. D. M. A. reference trypsin was adopted tentatively, with the recommendation that it be re-assayed this year. Eight laboratories collaborated.

The methods of assay were the same as employed last year, *viz.*, the U. S. P. X method and the Smith-Sorensen method. The results are shown in the following table:

Lab	TRYPSIN			
	U. S. P. Method 1933	Smith Sorensen 1933	U. S. P. Method 1932	Smith Sorensen 1932
1	20.0	23.6	25.0	25.0
2	32.0	26.8	35.0	23.5
3	26.3	28.0	37.5	35.8
4	25.0	26.3	25.0	26.3
5	23.8	23.9	25.0	25.6
6	30.0	31.8	25.0	25.8
7	25.0	34.0	25.0	26.9
8	33.0	36.3	33.3	37.5
Average	26.9	28.8	28.8	28.3

The figures mean the number of parts of casein digested by one part of the trypsin.

It will be noted that the average strength by the U. S. P. method in 1932 was 28.8, whereas this year it is 26.9. By the Smith-Sorensen method 28.3 in 1932 and 28.8 in 1933. This would indicate that the reference trypsin had not undergone any serious deterioration, if any, during the past year.

Comments by various laboratories are worthy of mention.

Laboratory 1

'It will be noted that the reference sample has shown deterioration and that the U. S. P. X method indicates a greater loss in potency than does the modified Smith-Sorensen method.

"Our experience leads us to believe that trypsin is distinctly unstable.

"We believe that the modified Smith Sorensen method appears the means of providing a standard assay procedure, at least until something better is proposed. For instance a sample of trypsin requiring not less than 2 cc. of exactly  $N/20$  sodium hydroxide solution would be considered to meet the U S P requirement."

#### Laboratory 3

"We re-assayed the six samples that had been used to make up this reference standard and I give you below the comparative tests on all six as made in 1931 and again as recently retested"

	U S P (1931) Per Cent	Method (1933) Per Cent.	Smith Sorensen Method (1931) Per Cent	(1933) Per Cent
No 1	120	110	112	122
No 2	100	85	123	112
No 3	105	90	100	86
No 4	110	105	98	101
No 5	105	110	128	127
No 6	100	90	100	91

"From these results it will be observed that the two methods check very closely in regard to deterioration of samples with the exception of No. 2. In samples Nos. 3 and 6 there appears to be about a 10 per cent loss in activity."

Mr. Taylor calls attention to a lack of preciseness in the directions of the U S P method with regard to the time that should elapse between the removing of the tubes from the bath and the adding of the acetic acid alcohol mixture. Also, that there is no specification of temperature to which the tubes should be cooled before adding the acid-alcohol mixture. Both of these factors affect the accuracy of the end-point.

"There is a point to be observed in regard to the Smith Sorensen method that has to do with adjustment of the hydrogen ion concentration. From our experience we do not believe phenol red a satisfactory indicator for adjustment of casein solutions. In the work we did on this particular method several years ago we tried phenol red and could not obtain satisfactory results so we carried out our adjustments using brom thymol blue and thymol blue as indicators. We were able in this way to adjust solutions to a definite  $pH$  colorimetrically which we were able to check almost perfectly by potentiometric means."

Mr. Willson of Parke Davis & Co. is working on the details of a revised simplified method of preparing the casein solution. This would be a big advantage, since the present method of making the casein solution for the Smith Sorensen method is time consuming, and is the main objection to the method.

Mr. W. H. Blome called attention to an uncertainty in the directions for making up the casein solution for the Smith Sorensen method, in that a 4 per cent solution could not be obtained if the final volume was as directed and no allowance made for the portions of the solution used to determine the  $pH$ . Inquiry among the collaborators disclosed that practically all of them had recognized the discrepancy and had made up the final solution on a 4 per cent basis.

The Smith Sorensen method appears to be gaining favor among the collaborators. It has the advantage over the present U S P method of greater preciseness of end point and would not require a standard reference trypsin.

#### RECOMMENDATIONS

It is recommended that

1. The present study of the A D M A reference trypsin be continued.
2. The Smith-Sorensen method be studied more critically with a view to simplifying it and ascertaining its accuracy.
3. The U S P Revision Committee be asked to postpone final action on pancreatin as long as possible, so that the A D M A may study certain improvements in the methods of assay.

## RENNIN

This year's work consisted of a further study of the keeping qualities of the A D M A reference rennin. The collaborators were asked to test the rennin by the National Formulary Fifth Edition Method.

The results are contained in the following table

## RENNIN

Lab	Time of Coagulation (Minutes)	Milk	Acidity before Adjustment (Per Cent)	Acidity after Adjustment
1	9 5	Certified	0 144	Not adjusted
1	10 0	Pasteurized	0 140	Not adjusted
2	9 5	Pasteurized	0 140	0 146
3	11 75	Pasteurized	0 142	Not adjusted
4	11 16	Pasteurized	0 145	Not adjusted*
4	11 75	Pasteurized	0 145	Not adjusted†
4	10 42	Pasteurized	0 145	Not adjusted‡
5	10 5	Grade A Raw	0 144	Not adjusted
6	10 25	Pasteurized	0 144	Not adjusted
7	11 5			0 147
8	12 25	Grade A	0 165	Not adjusted
8	22 0	Grade A	0 165	0 150

\*Milk two days old    † Milk one day old    ‡ Milk four hours old

Laboratory No. 1 comments,

'Two reference samples submitted to us in October of 1928 have also been re assayed at this time and have shown no appreciable deterioration

Our experience indicates that rennin is stable over a period of years. We would recommend that a standard rennin be adopted."

Laboratory No. 3 states,

'We have had a peculiar experience in retesting the A D M A reference rennin according to the National Formulary 5th Edition Method. Our first test was as follows

Curdling time 17 minutes 5 seconds

Kind of milk Pasteurized    •

Acidity 0 141 per cent lactic acid (no adjustment)

'This result on curdling time is much different from results obtained during the past several years using this same sample. The curd obtained instead of being firm as it usually is, was stringy. We attributed this slowness in curdling to the sample of milk used although its acidity was almost exactly that which is desired and there was no adjustment of acidity by addition of alkali. Subsequently we obtained another quantity of milk from the same dairy and the test on the standard rennin results as follows

Curdling time 11 minutes 45 seconds

Kind of milk Pasteurized

Acidity of milk 0 142 per cent lactic acid (unadjusted)

'The first test above is the first one in several years of testing that has been outside the limits of 9 minutes to 13 minutes curdling time. Usually we have been able to blame variations of curdling time upon variations in acidity and especially attempts to adjust the acidity artificially. In this case these factors are not involved but it appears that this is one more fact indicating that variation in milk supplies sometimes unknown may very materially affect the result of the rennin test

We have made it a rule not to use for the test any milk that exceeded an acidity of 0.15 per cent calculated as lactic acid and we have abandoned altogether any idea of adjusting milk that is more acid by adding sufficient alkali. If the milk is not naturally at the proper acidity, we do not use it.

"I am decidedly of the opinion that in the next revision of the National Formulary adjustment of the milk by the addition of alkali should be omitted but that preferably a test for acidity should be included and milk that runs more than 0.15 per cent acidity as lactic acid should not be used.

'Of course, with a reference standard for direct comparison it does not make so much difference if the acidity varies somewhat and the adoption of such a standard would help to eliminate the errors that may occur due to variations in sources of supply of milk."

Laboratory No. 4 states,

"These tests indicate that, compared with the laboratory test last year, this rennin standard has decreased slightly in activity."

Laboratory No. 5 concludes that the standard rennin "curdles the milk in slightly less time than we reported last year." This laboratory also makes the suggestion that the titration for acidity can be made more sensitive if five drops of the milk being titrated be added to 5 cc. of water. The pink color shows up better. It is customary to use 50 cc. of the milk to which 0.5 cc. of phenolphthalein solution has been added. After the preliminary titration a second one should be made using just a little less than expected amount of alkali.

Laboratory No. 6 remarks that this year's results "are very close to those which we reported last year."

This year's work confirms the previous conclusion that the National Formulary Fifth Edition Method is unsatisfactory and unreliable, and that a standard rennin would overcome the difficulties inherent in the present method. The work adds another year's cumulative evidence for the excellent keeping quality of the A. D. M. A. reference rennin and its suitability as a standard in case a method based upon the use of a standard is adopted in the National Formulary Sixth Edition.

#### RECOMMENDATIONS

It is recommended that

1. The study of the keeping quality of the A. D. M. A. reference rennin be continued.
2. On behalf of the American Drug Manufacturers' Association a revised method for the assay of rennin be submitted to the National Formulary Sixth Edition Revision Committee. Such method will make use of a standard rennin and will omit adjustment of the acidity of the milk.

In conclusion, I want to express my very sincere appreciation to the members of the committee for their splendid collaboration during these many years. It is hoped that their efforts will result in improved methods of assay in the forthcoming editions of the United States Pharmacopoeia and of the National Formulary.

DAVID KLEIN, <i>Chairman</i> ,	HOWARD T. GRABER,
W. H. BLOME,	F. W. HEYL,
H. A. B. DUNNING	H. W. RHODEHAMEL,
B. TAPPEN FAIRCHILD	F. O. TAYLOR,
FREDERIC FENGER,	D. M. FINDLAY

#### DETERMINATION OF TAUROCHOLIC ACID IN BILE SALTS \*

F. E. WILLSON

The bile contains as its chief constituents, taurocholic acid and glycocholic acid. These generally occur as the sodium salts and are not to be found in the pancreatic juice or in any of

\* Presented at the Twenty Second Annual Meeting of the American Drug Manufacturers Association held at Hot Springs, Virginia, May 8-11, 1933.

the normal animal secretions other than the bile. Their function in the bile is to emulsify fats and assist in the absorption of fatty acids. In this way they are material aids to digestion. These acids may be present in the bile in varying proportions depending upon the animal source and the general metabolism of the animal. Besides these two acids there may be present other analogous substances such as taurocholic acid and glycocholic acid. It is generally agreed these are present in very small amounts, if at all, and are therefore worthy of little consideration.

The problem of obtaining a satisfactory method for the determination of the relative amounts of taurocholic acid and glycocholic acid has been a matter of investigation for a number of years. At first, the chief interest in this respect was the determination of the two acids in bile, itself so that the results might be used in conjunction with certain clinical observations. When these two important constituents of the bile were made available commercially in the form generally known as bile salts the demand for methods of determination become even more a matter of interest and investigation.

The methods for the determination of the taurocholic acid content of bile and mixtures of bile salts are based principally upon its sulphur content since taurocholic acid contains sulphur while glycocholic acid does not. Some of the earlier investigators attempted to use a method based upon a difference in solubility of the two acids with a subsequent amino nitrogen determination. Foster and Hooper (1) suggested such a method in which the taurocholic acid fraction was hydrolyzed with sodium hydroxide into taurine and cholic acid. The amino acid content of the taurine was then determined by the Van Slyke method. A later method (2) used a similar line of procedure but besides determining the amino nitrogen of the taurine the sulphur content was also determined and the two used in conjunction in calculating results. The same investigators elaborated on this method in a later communication (3) and suggested that the Asboth Dunning method for determining the sulphur content be used. Many other methods are to be found by reference to the literature but in principle most of them follow along the same lines. Since most of these earlier methods were for the determination of taurocholic acid in the bile, itself, there was a tendency to separate it from the glycocholic acid by means of solvents. These methods gave unsatisfactory results because the differences in solubilities made use of did not entirely exist. Also, Hammersten showed that in many samples of bile there were present certain ethereal sulphates and sulpholipins that possessed the same solubilities as did taurocholic acid. Therefore, any method using the sulphur content for calculating the amount of taurocholic acid in bile would give erroneous results if these substances were present. In the commercial product, marketed as bile salts we are not confronted with this problem since the methods of preparation practically exclude the ethereal sulphates and sulpholipins. Therefore our chief problem from a commercial standpoint is to obtain some satisfactory method for determining sulphur in organic combination in a product of this kind. From this determination the taurocholic acid content then can be calculated.

Several years ago the Sub Committee on Digestive Ferments and Glandular Products of the American Drug Manufacturers' Association adopted for study the bile salts. Dr. Kirk submitted methods (4) for determining both glycocholic acid and taurocholic acid. The method for determining taurocholic acid was based upon a sulphur determination using the Hoffman Gortner method (5). On giving this method a trial in a number of different laboratories it was found that extremely divergent results were obtained. The taurocholic acid content of the particular sample under investigation was found to range anywhere from 30 per cent to 49 per cent. This indicated that the method was unsuitable for analytical purposes. This wide range of results appeared to us as being due to the fact that complete oxidation of the sulphur was not insured. The method had a further disadvantage in that it required a considerable length of time to carry it out. This is a point that must be considered in routine analytical work.

Since there were two serious objections to the Hoffman Gortner method applied to bile salts it seemed that there should be some other available method for use. For that reason a search was made for methods and the ones that showed promise of meeting the two requirements were given a trial. The method which gave consistent results and at the same time was rapid in manipulation was one employing the Parr Sulphur Bomb. Following is an outline of the method devised for its use as applied to bile salts.

*Procedure*—A 1 Gm. sample of bile salts is weighed into the ignition cup of a Parr Sulphur Bomb. One Gm. of potassium chlorate and 10 to 15 Gm. of sodium peroxide, followed by 0.2

Gm of benzoic acid are added After covering the ignition cup with the top equipped with the ignition wire the whole is sealed in the bomb by means of the screw cap The bomb is then well shaken to insure uniform mixing of the contents The contents are then ignited in the usual manner using an electric current After ignition the bomb is cooled, the ignition cup together with the separated top is placed in a 600 cc beaker About 250 cc of distilled water is then added and the fusion mixture brought into solution with the aid of heat After complete solution the ignition cup and top are removed washing well with distilled water The solution is then carefully acidified with hydrochloric acid After an acid reaction has been reached the solution is filtered and the sulphur determined in the filtrate preferably by the gravimetric method using barium chloride solution The amount of sulphur found multiplied by 16.07 gives the amount of taurocholic acid present in the sample

If the gravimetric method is used the sulphur is in combination as barium sulphate and must be calculated from the weight of the precipitate obtained The conversion factor 16.07 is obtained by considering taurocholic acid to have the formula  $C_{24}H_{45}NSO_7$  with a molecular weight of 515.45

The reagents used in this method must necessarily be first tested for sulphur and found to be sulphur free

Determinations by this method may be carried out rapidly The preparation and ignition of the sample requires only about 20 minutes while the sulphur determination ordinarily requires about 2 hours This is a considerable advantage over the Hoffman Gortner method which generally requires several days to carry to completion

The proposed method also has the added advantage of carrying the oxidation to completion This probably can be best illustrated by comparison of results obtained by the Hoffman Gortner method and this Parr Bomb method

	Hoffman Gortner Method	Parr Bomb Method
Determination No 1	32.90% taurocholic acid	38.92% taurocholic acid
Determination No 2	33.89% taurocholic acid	41.22% taurocholic acid
Determination No 3	37.89% taurocholic acid	42.59% taurocholic acid
Determination No 4	33.22% taurocholic acid	42.33% taurocholic acid

It will be observed from the above results that lower results are obtained by the Hoffman Gortner method This would be indicative that complete oxidation of the sulphur is not reached With the Parr Bomb method there was some variance in results but when it is considered that the conversion factor from sulphates to taurocholic acid is high (16.07) these results would be expected

The Parr Bomb method has been used with considerable success in this laboratory since its submission to the A. D. M. A. The following table contains the results of the analyses of four different samples of bile salts which are representative of results that may be expected

Sample No 1	I	38.04% taurocholic acid
	II	40.37% taurocholic acid
	III	38.84% taurocholic acid
Sample No 2	I	40.73% taurocholic acid
	II	41.36% taurocholic acid
	III	40.89% taurocholic acid
Sample No 3	I	47.19% taurocholic acid
	II	47.58% taurocholic acid
	III	46.53% taurocholic acid
Sample No 4	I	47.23% taurocholic acid
	II	47.69% taurocholic acid
	III	47.76% taurocholic acid

In working with bile salts we believe the Parr Bomb method will give more accurate and reliable results for the sulphur content than any of the other available methods Consequently a truer evaluation of taurocholic acid will be obtained If the method were applied to bile a special preparation of the sample would have to be first carried out in order to exclude any of the other sulphur-containing substances other than taurocholic acid being present



## LITERATURE CITED

- (1) Foster and Hooper *J Biol Chem* (1919) 355-366
- (2) Rosenthal and Falkenhausem *Arch expil Path Pharmacol*, 98 (1923), 321-338
- (3) Rosenthal and Falkenhausem *Klin Wochschr*, 2 (1923), 1111-1114
- (4) Proceedings of the American Drug Manufacturers Association (1929)
- (5) Hoffman and Gortner *J A C S* 45 (1923) 1033

## ASSOCIATION BUSINESS

### AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1932-1933

Office of the Secretary 10 West Chase St Baltimore, Md

#### LETTER NO 10

July 26 1933

*To the Members of the Council*

70 *Tentative General Program for the Eighty First Annual Meeting* Motion No 20 (Council Letter No 9 page 663) has been carried and the tentative general program is approved Local Secretary Stanley and his associates have been advised and copies of the program have been sent to the pharmaceutical press

71 *Authorizing Dr Hilton to Sign Checks in the Absence of Treasurer Holton* Motion No 21 (Council Letter No 9 page 663) has been carried and the approved banks of deposit have been advised of the authority granted to S L Hilton in the absence of C W Holton

72 *Research Award* Motion No 22 (Council Letter No 9 page 664) has been carried and Dr Husa has been advised

73 *Contract for Printing and Distributing the Year Book, Volumes 20 and 21* Motion No 23 (Council Letter No 9, page 664) has been carried and the contract for printing and binding the YEAR BOOK Volumes 20 and 21 in one binding has been awarded to the Lord Baltimore Press Baltimore, Md

74 *Applicants for Membership* Motion No 24 (Council Letter No 9 page 664) has been carried and applicants for membership numbered 161 to 173, inclusive, have been elected to membership

75 *Contract for Printing and Binding the National Formulary VI* Recently Chairman DuMez issued the following bulletin to the members of the Committee on Publications

'After consultation with Chairman Gathercoal of the Committee on National Formulary as to the progress of revision and in view of the possibility of increases

in cost invitations were sent out recently to the firms which might be interested to submit bids on the cost of printing and binding the N F VI

Bids were received from the J B Lippincott Company Philadelphia, Pa, the Lord Baltimore Press, Baltimore Md, and the Mack Printing Company, Easton, Pa The estimates of these three firms were carefully checked and that submitted by the Mack Printing Company was found to be the most favorable This bid will result in decided reduction in the cost of the book over that of the N F V It is estimated that there will be a saving of between \$5000 and \$6000 on the first series of 25 000 copies Approximately 45 000 copies of the N F V have been printed and if the sale of the N F VI compares, there will be a total saving of from \$10 000 to \$12 000 Of course, the amount cannot be definitely stated as the contract calls for an adjustment for labor and materials on the basis of existing conditions, at the time later series may be printed

Inasmuch as the Mack Printing Company handled the work satisfactorily for the N F V and as this firm has now had the experience of printing one edition of the National Formulary and as their bid is the most favorable, it is suggested that it be recommended to the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION that the contract for printing and binding the N V VI be awarded to the Mack Printing Company "

The following communication has just been received from Chairman DuMez

A majority of the members on the Publication Committee have voted in favor of the

Mack Printing Company with respect to the printing of the N F VI

'It is, therefore, recommended to the Council that the contract for the printing and binding of the National Formulary VI be awarded to the Mack Printing Company of Easton, Pa., on the basis of the estimate submitted'

*(Motion No 25) It is moved by DuMez that the contract for printing and binding the National Formulary VI be awarded to the Mack Printing Company, Easton Pa., on the basis of their estimate and that the President and Secretary of the Association be authorized to sign the contract*

**76 Joint Membership Fee with the N A R D and the State Pharmaceutical Associations**  
The following communication has been received from the Maryland Pharmaceutical Association

At the recent annual meeting of the Maryland Pharmaceutical Association, the following resolution was adopted

'Resolved that the Maryland Pharmaceutical Association concur in the suggestion of President Kantner that the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION and the Executive Committee of the National Association of Retail Druggists be urged to confer for the purpose of working out some cooperative plan whereby membership in the state associations will carry with it membership in both national organizations'

Chairman Hilton has advised that this proposal be included in this letter for the information of the members of the Council, and that it be considered at the joint meeting of the Council with the Executive Committee of the N A R D on Wednesday, August 30th, at Madison Secretary Henry of the N A R D agrees that this is a proper subject for discussion at the joint meeting

**77 Life Membership** Theodore D Wetterstroem, Columbus, Ohio, has become a Life Member of the Association through the payment of dues for thirty seven consecutive years

**78 Use of Text of N F V** The following communication has been received from Samuel M Gordon, Secretary, Council on Dental Therapeutics American Dental Association

'The Council on Dental Therapeutics, of the American Dental Association, is

planning to run serially in *The Journal of the American Dental Association*, and subsequently reprinted in book form, a series of articles on drugs useful in dentistry In character, the book will be a combination of *Useful Drugs* and *New and Nonofficial Remedies* of the American Medical Association

Included in the book will be, of course, comments on parts of the *National Formulary*, Fifth Edition Permission to use for comment such parts is requested It is, of course, understood that any such comments or quotations from the *National Formulary* will be made solely on the responsibility of this Council It is hoped that this permission can be obtained'

Chairman DuMez of the Committee on Publications recommends that permission be granted to use for partial reproduction the text of the N F V, and that in this instance the permission be granted without charge

*(Motion No 26) It is moved by DuMez that permission to use the text of the N F V for partial reproduction in a series of articles on drugs useful in dentistry, to run serially in the Journal of the American Dental Association and subsequently be reprinted in book form, be granted to the Council on Dental Therapeutics of the American Dental Association without charge upon condition that there be placed upon the reverse of the title page of the booklet the usual acknowledgment*

**79 Applicants for Membership** The following applications properly endorsed and accompanied by the first year's dues have been received

No 174, William M Armstrong, Jr, 2167 E Cumberland St., Philadelphia, Pa., No 175, Theodore Campbell, Jr, 63rd St & Overbrook Ave., Philadelphia, Pa., No 176, Laomie Gilbert, Jr, Benson, N C., No 177, M C Kaegi, North Pacific College of Oregon, Portland Oreg., No 178, Lillian Mary Langevin, 3117 So 16th St., Lincoln Nebr., No 179, John Andrew Lynch 2132 N 9th St., Philadelphia, Pa., No 180, Orville McLaughlin, City Drug Store, Pawnee, Okla., No 181, John Russell Mason, George Washington University Library 2023 G St., N W, Washington, D C., No 182 Harry A Mikkola, 318 Sherman Ave., Evanston, Ill., No 183, Harold E Repass, R R No 2, Carmel, Ind.,

No 184 Leonard Dale Scif, 5919 Wyatt Ave ,  
Cincinnati, Ohio No 185 Sister Beatrice  
Martin St Leo's Hospital, Greensboro N C ,  
No 186, Sister Margaret Mary McCarthy,  
St Mary's Hospital Saginaw, Mich , No  
187 Chas E Smythe 710 S E 14th Ave ,

Minneapolis Minn , No 188, Asa N Stevens,  
37 Johnson Ave , Indianapolis, Ind

(Motion No 27) Voted on applications for  
membership in the American Pharmaceutical  
Association

E F KELLY, Secretary

## LOCAL COMMITTEES FOR A PH A MEETING

Local Secretary Emerson D Stanley Con-  
vention Committee Chairman Oscar Renne-  
bohm, A F Menges, Edward J Ireland,  
Franklyn J Bergman, Treasurer Emil A  
Hayden, Secretary Charles C Charmley  
Chairmen of Sub-Committees Women's Mrs  
A F Menges, Entertainment Richard Weiss  
Hotels, E G Kuenzi Publicity Ralph W  
Clark, Registration Arthur H Uhl Trans-  
portation, R J Tiedeman Chairmen of  
Affiliated Associations American Association  
Colleges of Pharmacy Miss Nellie A Wake-  
man, National Association Boards of Pharmacy,  
Oscar Rennebohm National Conference Phar-  
maceutical Research, Arthur H Uhl Plant  
Science Seminar, W O Richtmann, Confer-  
ence of Pharmaceutical Association of Secre-  
taries, Ralph W Clark Conference of Pharma-  
ceutical Law Enforcement, Harry Klueter  
Women's Committee Chairman, Mrs Adolph  
F Menges, Chairmen of Sub-Committees  
Mrs Wilbur Beache, Mrs Charles Charmley  
Mrs Ralph Clark, Mrs Andrew Helstrom  
Mrs Edward Kremers Mrs Harry Leonard  
Mrs Oscar Rennebohm Mrs W O Richt-  
mann, Mrs Emerson D Stanley Miss Nellie  
Wakeman

## TRANSPORTATION AND RATES TO MADISON

On account of the Century of Progress ex-  
position, greatly reduced rates to Chicago are  
in effect from every part of the country—as  
low as one fare plus 25 cents for the round trip  
and slightly higher rates with a longer return  
limit

The Committee on Transportation of the  
A PH A has secured a reduced round trip  
rate of one and one third fare to Madison on  
the identification certificate plan good for  
thirty days Tickets on this plan will be on  
sale as early as August 14th, in distant  
territories

However, it is suggested (1) That members  
buy the best special excursion ticket to Chicago  
they can get and use the identification cer-  
tificate to buy round trip ticket from Chicago  
to Madison, (2) members whose route to  
Chicago is through Madison should buy the  
best special excursion ticket to Chicago and  
obtain stopover at Madison for the meeting

The round-trip fare to Madison at the one  
and one third certificate rate is \$6 25

## A TRIP TO THE DELLS OF THE WISCONSIN RIVER

RALPH W CLARK

Arizona has its Grand Canyon, and the  
Hudson its Palisades Mention of Northern  
Wisconsin, Michigan and Maine brings visions  
of towering pines, big woods and countless  
lakes Pinehurst, French Lick and White  
Sulphur Springs invite the wealthy to days of  
leisure, golf and rest Nowhere can you find  
all of these things so beautifully blended and to  
be enjoyed so well as in the Wisconsin Dells

Here, nature has assembled in miniature the  
beauties and grandeur of our country's scenic  
masterpieces Here you will find the 'grand  
canyon' of the Wisconsin River—not unlike its  
big brother in the West Towering, pine-  
covered palisades lofty crags and fantastic  
rock formations frame in primitive glory the  
dark waters of the Wisconsin that for ages have  
carried a breath of mystery and adventure  
from the far north

The far flung hills of the Dells region are  
heavily wooded Pine trees and hemlock,  
birch and hardwoods, with a sprinkling of  
jewel like lakes, bring to you a true taste of  
north woods splendor

Romantic, adventurous, scenic, historic, the  
Wisconsin Dells may be visited by those at-  
tending the Madison convention This trip  
through sixty miles of beautiful Wisconsin  
followed by a three hour boat trip on the river  
will be available, without cost, except for  
meals, on September 2nd

## PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council —Part of Chapter VI, Article VI of the By-Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association"

ARTICLE IV of Chapter VII reads "Each local branch having not less than 50 dues-paid members of the Association holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication, may elect one representative to the House of Delegates"

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

### DETROIT

The Pharmaceutical Conference, in conjunction with the May meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held in Ann Arbor May 11 1933 The Conference was opened by Dean Edward H Kraus of the College of Pharmacy of the University of Michigan who acted as chairman

Dr Alexander G Ruthven president of the University of Michigan welcomed the pharmacists of Michigan to Ann Arbor and invited them to make use of the University which belongs to the people of Michigan

Dean Kraus arranged a splendid program for the day, the speakers were selected from the faculty of the University The subjects were so diversified that virtually a postgraduate course was obtained by the large gathering

The first speaker on the program was Dr Charles W Edmunds professor of materia medica and therapeutics in the medical school Dr Edmunds spoke on "Drug Addiction a World Problem" He presented some interesting and startling figures on drug addiction The Island of Formosa has a law making it compulsory to cure addiction Turkey and Syria present the problem of smuggling In 1931 alone four tons of heroin were seized at the wharves while 11 650 kilos were seized in side the country

The chief source of opium has been China but owing to the unsettled condition of that country Japan has become the source of manufacture However addicts are few in that country India uses a decoction of poppy

capsules known as Post" and is used as a beverage which is even fed to the young The last opium auction held in Calcutta was in 1926 Egypt with an adult population of 300 000, presents a real problem, one in ten use hashish 100,000 use opium and 54 000 are addicts to heroin

France at one time had 325 factories manufacturing narcotics Since the last conference she has reduced them to 15 the illicit traffic center of the world has been driven to Bulgaria Dr Edmunds presented some interesting figures regarding the condition of our own country "The United States" he says, confiscated three tons in 1931, 17,000 ounces of morphine in one shipment In 1930 3000 ounces of heroin alone were seized, while in 1931, 9000 ounces were confiscated the manufacture and use of heroin being prohibited in this country' He said there are 120 000 addicts in the United States 80 000 in Canada of which number there are 2640 in penitentiaries 1800 in Leavenworth alone" At the present time the Government has under construction two hospitals for the cure of addiction, one at Lexington Kentucky, and the other at Fort Worth Texas

The second speaker was Dr Leonard L Watkins, associate professor of economics He gave an interesting and illuminating talk on

"The Present Banking Situation" Besides speaking encouragingly of the present situation and expressing confidence in President Roosevelt and his plans he urged the guarantee of deposits to the extent of at least 75 per cent

The morning session adjourned at noon at which time a luncheon was served at the Michigan Union. Dean Kraus acting as toastmaster, introduced all present.

The Conference reconvened at 2:00 P.M. with Dr. Russell A. Bunting, professor of oral histology, School of Dentistry. He spoke on the Present Status of Our Knowledge Concerning the Control of the Decay of the Teeth. He startled the druggists by stating there is more harm done with candy bars than good done with all of the drugs that are sold. Dr. Bunting told of the success obtained in various institutions where periodic examinations and observations are made. Particularly interesting was the important part diet plays in the preservation of the teeth and the control of decay.

The next speaker was Dr. Howard B. Lewis, professor of physiological chemistry, Medical School. He spoke on Recent Advances in the Study of Hormones and Vitamins. Hormones are supplied in the body by the glands while vitamins are taken into the body. They both act as chemical regulators and are necessary for a healthy body. A concentration of vitamins has been obtained to a degree where  $1/1000$  of a mg. produced the desired effect. This minute dose is termed a gamma. Dr. Lewis stated that the study of this most important subject was still in its infancy and rapid strides were being made in obtaining definite information and facts regarding the use and manufacture of hormones and vitamins.

The last speaker of the Conference was Dr. Nathan Sinai, professor of hygiene and public health. He said pharmacists of today have the same problems that have confronted the profession for ages. Back in the 17th century King James held grocers were just merchants while the pharmacist was a professional man and pharmacy was truly a profession.

Dr. Sinai compared the health of the state (which the last two years ranked the highest in the country) to day with the past. In 1900 there were 45,000 cases of typhoid, diphtheria and tuberculosis, while in 1931 the total was only 8,000 preventative medicine being responsible for this splendid record. The study of medical care and the cost have been taken up by the federal government. Dr. Sinai has made a thorough study of this problem and the medical profession has cooperated generously. He said that it is the task of pharmacy to cooperate with medicine and dentistry. A trip to the College of Pharmacy and

other University buildings proved very interesting to many who were eager to seize the opportunity of seeing this institution of higher education that every Michigan resident is justly proud of.

A chicken dinner was served in the Michigan Union after which the assembly adjourned to the auditorium of the Natural Science Building where the regular May meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was called to order by Vice President Felix Johnson of the University of Michigan.

John Weisel of Monroe, offered a resolution endorsing Director Parr's plan, which he had presented to President Franklin D. Roosevelt. The resolution was seconded by Dean R. T. Lahey and after Mr. Parr explained his plan it was unanimously adopted and the secretary was instructed to send a copy of the resolution to the President.

Chairman Leonard A. Seltzer of the nominating committee, reported the following nominees to serve as officers of the Detroit Branch for the ensuing year: *President*, Felix Johnson, U. of M.; *First Vice President*, Lawrence Malche, C. C. D.; *Second Vice President*, Frederick Arnold, D. I. T.; *Student Council*, Hamilton Whitman and Florence Hartsoff, U. of M.; *Henry Tyszkla* and *Wm. Hennessey*, D. I. T.; and *Perton Todd* and *William Blatchley*, of C. C. D.; *Council of Clerks*, Robert Woonsocket, U. of M.; *Douglas Robinson*, D. I. T.; and *James Liddell*, of C. C. D.; *Secretary*, Bernard A. Bialk, Treasurer, Fred Ingram and *Chairman* of the Program Committee, Dean R. T. Lahey, continue to serve as permanent officers. On motion of Dean E. H. Kraus and Prof. Joseph L. Dorian, nominations were closed and the report of the committee was accepted and adopted by a unanimous vote cast by the secretary.

The newly elected president, Felix Johnson, after a few remarks pledging his best efforts to carry on in a manner which will justify the confidence placed in the students in serving as officers of the Detroit Branch—called on Dean Kraus of the College of Pharmacy to introduce the speaker of the evening, Dr. Carl D. LaRue, assistant professor of botany.

Dr. LaRue gave a very interesting talk on his observations on 'Drug Collections in the Tropics'. He illustrated his talk with many very interesting slides. The speaker had spent three years in Sumatra representing the U. S. Rubber Co., three years in Brazil for the

U S Government and three more years in the interest of the Ford Motor Co , devoting most of his time in developing the rubber industry

Dean Lahey moved a rising vote of thanks to the speaker for his interesting and entertaining presentation, also to Dean Kraus and the faculty of the College of Pharmacy of the U of M for their hospitality and the interesting program prepared by them

Mr Seltzer offered a motion instructing the secretary to send out a notice of assessment of \$1 00 to all members in order that obligations now outstanding may be met The motion was seconded by Dean Kraus and unanimously adopted This brought to a close one of the most interesting days in the history of Michigan pharmacy

BERNARD A BIALK *Secretary*

## CONSTITUTION AND BY-LAWS OF LOCAL BRANCHES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

For Constitution and By-Laws of Student Branches refer to the following issues of the JOURNAL for this year *Northern New Jersey Branch A Ph A* , March JOURNAL, pages 244-246, *North Pacific Branch, A Ph A* , March JOURNAL pages 246-248, *California College of Pharmacy Student Branch A Ph A* , June JOURNAL, pages 572-573

## REPORT OF MEETING OF MARYLAND PHARMACEUTICAL AND BALTIMORE RETAIL DRUGGISTS' ASSOCIATION

The report herewith of the joint meeting, held August 14th, of the Maryland Pharmaceutical Association and of the Baltimore Retail Druggists' Association includes a report of the National Conference of State Pharmaceutical Associations held in St Louis, August 8th and 9th The JOURNAL A Ph A is indebted to Robert L Swain, Chairman of the St Louis Code Committee and editor of the *Maryland Pharmacist* for the following report and thanks are expressed to him for the courtesy

"The joint meeting of the Maryland Pharmaceutical Association and the Baltimore Retail Druggists' Association held at the Lord Baltimore Hotel, on Monday night, August 14th, had perhaps the largest attendance in the history of these groups Nearly six hundred persons were present The meeting was presided over by President L V Johnson, of the State Association, and was called to discuss the Code of Fair Business Practice adopted by the National Conference of State Pharmaceutical Associations at St Louis on August 8th and 9th

"The St Louis code was read by Dr A G DuMez It was discussed in detail by L M Kantner and Robert L Swain, delegates to the St Louis Conference It was pointed out that the Conference was well attended and that it represented probably 80 per cent of the drug stores of the country Feeling that such a body was truly representative, as this term is used in the National Industrial Recovery Act, it was said that the code adopted by the St Louis Conference was most representative of the views of retail pharmacists The Conference labored two days on the code, and great care was taken to insure that it was in complete accord with the sentiment expressed by those present.

' The following code committee was elected

A W Pauley, St Louis Missouri  
Denny Brann Des Moines Iowa  
C C Chichester Macon, Georgia  
George W Mather, Albany, New York  
E F Kelly, Baltimore Maryland  
Robert L Swain Baltimore, Maryland *Chairman*

This committee, it was stated, was to confer with the N A R D Code Committee and through joint action, to work out a code really representative of retail pharmacists throughout the country

'The next speaker was Nicholas Gesoalde, of New York, and he gave a snappy and humorous account of the whole code movement from the very beginning This talk was illustrated

by witty references to his own experience in pharmaceutical organization work in New York. He seemed to feel that pharmacists might go along with some of the developments of the day, but he advised keeping a weather eye upon the manufacturers and others who had not been notorious in their efforts to help retailers in their troubles. He referred back to the courtesy card movements in New York some few years ago when the retailers of New York sought to work out some cooperative plan whereby profits might be obtained from the sale of advertised lines. Mr. Gesualde said that he and his committee in charge of the work narrowly escaped imprisonment, so strenuously did certain manufacturers seek to crush the plan. He said that he could not avoid looking at some manufacturers with a fishy eye when they come bearing gifts in place of the elub which they had used so many years. His address was rich in experience, and was greeted with prolonged applause.

'Dr. E. L. Newcomb, secretary of the National Wholesale Druggists' Association, New York, and Editor Jerry McQuade, of *Drug Topics* also of New York, made short but effective talks. Dr. Newcomb stressed the need for coordinated effort throughout the drug industry, and insisted that greater progress, and thus greater benefits, would come from unified action. Mr. McQuade, in his own forceful manner, spoke briefly in behalf of the Drug Institute. He feels that the Institute is the best bet that came before the drug business, in all its branches, in the history of pharmacy. Both Dr. Newcomb and Mr. McQuade were greeted with warm and spontaneous applause.

'Following the asking and answering of questions, the meeting adjourned.'

#### HIGH POINTS OF THE ST. LOUIS CODE

'Under the St. Louis Code of Fair Business Practice, it is considered unfair business practice

1 To make any false, misleading, deceptive, untrue, unsubstantiated, unfair or unethical statements in newspaper advertising, or by circulars, letters, window displays or by radio

2 To misbrand merchandise as to quality or to misrepresent as to price

3 All schemes, plans, subterfuges, trading stamps, coupons, gifts, prizes, chances, secret discounts, bonuses, rebates, concessions, combination and free deals, and all devices or designs which may weaken or nullify the code

4 For any retailer to receive or accept from any manufacturer or jobber any secret discount, commission, concession, refund, advertising allowance, unearned discount, or to employ hidden demonstrators

5 To offer drugs and medicines for sale by others than registered pharmacists

6 To permit any other than registered pharmacists from owning and operating drug stores

7 To offer combination or free deals

8 To substitute one product for another without the purchaser's consent

9 To permit merchandise to be sold through automatic vending machines and other labor supplanting devices

'Under the terms of the Code, all retailers will be required to buy at the same wholesale price, and no article can be sold at retail at less than overhead plus five per cent.

'The St. Louis Code is to be coordinate with the N. A. R. D. Code and in its final form, to be submitted to the NRA for approval. Hearings will be held and changes no doubt made before final acceptance by the President.'

---

#### HOURS AND WAGES FOR RETAIL DRUGGISTS

Due to the joint efforts of the National Association of Retail Druggists, the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Conference of State Pharmaceutical Associations the following agreements were concluded with the National Recovery Administration on August 15th. It will cover the hours and wages in Retail Drug Stores until a code of Fair Trade Practice for these stores is heard and approved. The Code will be heard on Thursday, August

24th, at the Department of Commerce Building, Washington, D C The following Articles III and IV apply to above

(FOR PARAGRAPH 2 OF PRESIDENT'S AGREEMENT CODE REFERENCE ) ARTICLE III

For stores open seven (7) days per week no employee shall be employed more than forty eight (48) hours per week, provided, however, that no employee shall be employed more than eight (8) hours during any twenty four (24) hour period, provided, further, that male employees working as waiters shall not be employed in excess of fifty four (54) hours per week pending adoption of a permanent code for the restaurant industry, provided, further, that the above maximum hours of labor shall not apply to registered, assistant registered and apprentice pharmacists (meeting the requirements of the state law to become registered pharmacists) The hours of any store in service operation shall not be reduced to below 90 hours in any one week unless such hours were less than 90 hours per week before July 1, 1933 and in the latter case not to reduce such hours at all'

(FOR PARAGRAPH 5 OF PRESIDENT'S AGREEMENT CODE REFERENCE ) ARTICLE IV

Employees (except messengers engaged in delivering medicinal products and persons under 16 years of age employed as permitted by Section 1, of the President's Reemployment Agreement) shall be paid not less than \$15 per week in the northern part of the United States nor less than \$14 per week in the southern part of the United States, in any city of over 500,000 population, or in the immediate trade area of such city nor less than \$14 50 per week in the northern part of the United States nor less than \$13 50 per week in the southern part of the United States in any city of between 250 000 and 500,000 population or in the immediate trade area of such city nor less than \$14 per week in the northern part of the United States nor less than \$13 per week in the southern part of the United States in any city of between 2500 and 250,000 population, or in the immediate trade area of such city, and in towns of less than 2500 population the wages shall be increased by not less than 20% provided however, that the wage need not be in excess of \$12 per week provided further, that employees with less than 6 months experience in retail stores shall be paid \$2 per week less than the minimum wage provided above The southern part of the United States is defined as follows Virginia West Virginia, North Carolina South Carolina Georgia, Florida Kentucky, Maryland Oklahoma and Texas Population for the purpose of this agreement shall be determined by reference to the 1930 Federal census "

Reference is made to the exemptions relative to maximum hours' requirement in an editorial comment of this issue of the JOURNAL

## CONFERENCE OF PHARMACEUTICAL LAW ENFORCEMENT OFFICIALS

### PROGRAM

- 1 Call to Order
- 2 Remarks by Chairman, Robert L. Swain
- 3 Report of Secretary M. N. Ford
- 4 Report of Finance Committee

### ADDRESSES

A Legislative Attempt to Restrict the Opening of New Drug Stores " Hugh P. Beirne, Connecticut

The Value of Annual Renewal of Pharmacists' Certificates in the Enforcement of Pharmacy Laws," Walter F. Meads, Iowa

A Legislative Attempt to Establish Prescription Tolerances," Robt. P. Fischelis New Jersey

'What Privileges Should Be Granted Unregistered Dealers under the Pharmacy Law?' Rowland Jones, South Dakota

'The Need for Strict Enforcement of the Law ' Mac Childs, Kansas

Restricting the Practice of Pharmacy to Proper Persons " George W. Mather New York

The Importance of Synonyms in the Enforcement of Drug Standards and Their Relationship to the Enforcement of Pharmacy Laws " Robt. P. Fischelis New Jersey  
Chairman, Special Committee

### ROUND TABLE DISCUSSIONS

The Proposed Amendments to the National Food and Drugs Act'

Narcotic Legislation in 1932-1933'

The Proper Enforcement of Fair Practice Codes for the Drug Industry under the National Industrial Recovery Act General Enforcement Procedure and Technique "

5 Election and Installation of Officers

6 Unfinished Business

7 Adjournment



## EDITORIAL NOTES

Editor E G Eberle, 10 West Chase Street, Baltimore, Md

Members of the Council, A PH A S L HILTON, *Chairman*, CHARLES H LAWALL *Vice Chairman*, E F KELLY, *Secretary*, H V ARNY, A G DU MEZ, H A B DUNNING, WILLIAM B DAY, C E CASPARI, J H BEAL T J BRADLEY, AMBROSE HUNSBERGER *Ex-Officio Members* W BRUCE PHILIP, *President*, ROWLAND JONES, G H GROMMET, *Vice Presidents*, C W HOLTON, *Treasurer*, E G EBERLE *Editor of the Journal*, A G DU MEZ, *Editor of the Year Book*, J W SLOCUM, *Chairman of the House of Delegates*

*Collaborators* The Members of the Council, E FULLERTON COOK, *Chairman*, U S P Revision Committee, E N GATHBRICAL, *Chairman*, N F Revision Committee, *Chairmen of the Sections*, A PH A W J HUSA, W J RIVARD, W PAUL BRIGGS, LEON MONELL, LOUIS GERSH ENFELD, CHARLES H STOCKING, *President* A A C P, CHARLES B JORDAN, *Chairman*, Executive Committee A A C P, CLARE F ALLAN, *President*, N A B P, HENRY C CHRISTENSEN, *Secretary*, N A B P Scientific Section—Board of Review on Papers *Chairman*, L W ROWE, Detroit Mich, JOHN C KRANTZ, JR, Baltimore Md, F J BACON Cleveland Ohio

### THE PROFESSIONAL PHARMACY

#### AN ANALYSIS OF PRESCRIPTION DEPARTMENT ACTIVITIES

BY FRANK A DELGADO AND ARTHUR A KIMBALL

The second installment of this contribution is published in this issue of the JOURNAL, the first part is printed in the July number, pages 671-693

We are taking the liberty of quoting from "World Trade Notes on Chemicals and Allied Products" Department of Commerce Bureau of Foreign and Domestic Commerce, August 14 1933

'*Prescription Department Activities Analyzed*—Valuable information that has never before been given will be found in 'The Professional Pharmacy' a detailed cost and operations analysis of prescription department activities of professional pharmacies made as a major phase of the National Drug Store Survey

It is not practical in an announcement this lengthy to outline the contents of the professional pharmacy. However, it might be stated that over 75 per cent of the sales volume of the professional stores studied was actual prescriptions. Sales volume of sample stores averaged \$107 000 each. Thirty five professional pharmacies occupied an average of 1632 square feet. Answers to the following questions are furnished. To what extent, if any, have the specialty type of prescriptions grown over a period of 20 years? Have prescriptions in liquid capsule and tablet form decreased or increased during the past 20 years? What is the financial outlay necessary to open a new store? What equipment is necessary? What population is

necessary to support a professional pharmacy? What is the turnover, gross margin, operating expenses and net profits of professional pharmacies?

Approximately 1808 pharmacists open new drug stores each year in the United States and were that part dealing with prescription ingredients brought to the attention of these pharmacists it is believed that a saving of from \$100 to \$500 per store could be accomplished

Two reports by the Bureau of Foreign and Domestic Commerce covering the professional activities of retail pharmacies have come from the National Drug Store Survey. The first dealt with the professional activities of 13 commercial type drug stores in St Louis. It was entitled 'Prescription Department Sales Analysis in Selected Drug Stores' and was issued, in 1932, by the U S Department of Commerce. Copies can be obtained from the Superintendent of Documents, Washington D C at 5 cents each. The second report, recently completed, is entitled 'The Professional Pharmacy—An Analysis of Prescription Department Activities' and presents a picture of the pharmacy which specializes in prescriptions and other items related to public health. This report, covering about 80 pages, is being printed in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION in four installments, July, August, September and October 1933 and will then be available in a paper bound book.

The value of the information contained in this report is not believed to be confined to the proprietors of professional pharmacies. It contains much information which should be of practical value to the proprietors of commercial type drug stores in increasing their volume

of prescription business and the profit possibilities of their prescription departments. Professors and students in colleges of pharmacy may find herein answers to some of the questions about which there has been conjecture. Drug wholesalers and manufacturers of chemicals, galenicals and pharmaceutical specialties should find the list of leading ingredients which was compiled after an analysis of 20 000 prescriptions of particular interest. Pharmacists who are contemplating the operation of a professional pharmacy will find certain information particularly directed to them. It is hoped, therefore, that all branches of the drug profession and trade will be in some way aided by the information presented in this report."

Reprints of "Professional Pharmacy" will be bound in paper cover at 25 cents per copy, 10 per cent discount in quantities of 6 or more and 20 per cent discount in quantities of 100 or more. It is assumed the schools of pharmacy will desire the publication for their students.

#### ACRIFLAVINE SOLUTION \*

W A Woodward reports that the following formula produces a stable preparation

Acridine	1 Gm
Glycerin	10 ml
Solution of ammonia	20 ml
Oleic acid	40 ml
Chloroform	180 ml
Liquid paraffin to	1000 ml

Dissolve the acridine in the glycerin with the aid of heat, add the oleic acid and the solution of ammonia stirring continuously until the oleate formed has completely liquefied. Allow to stand until the liquid becomes viscous, then transfer it to a dry bottle containing the chloroform, and shake vigorously until dissolved. Pour the chloroformic solution in a thin stream into the liquid paraffin, previously sterilized and cooled to 50° C.

It is possible to use direct heat, provided it is controlled. This hastens considerably the liquefaction of the rather troublesome oleate which, if a steam-bath be used, takes a much longer time to liquefy.

The product is in the form of a clear, mobile, reddish liquid. From a theoretical standpoint the principal criticism must be directed against the higher proportion, 18 per cent by volume, of

chloroform which the liquid contains. One of the great advantages claimed for acridine as a wound dressing is that its antiseptic action is exerted in concentrations too small to affect phagocytosis, and in this solution it should have been anticipated that the chloroform would seriously have interfered. However, the preparation has given complete satisfaction in clinical trials at St. Thomas' Hospital, both in obstetric work and as a wound dressing, and the fact that no pain was experienced tends to show that the presence of the chloroform is not deleterious.

The solution was effective *in vitro* against *B. coli* and to a less extent against *Streptococcus hemolyticus* and *Staphylococcus aureus*—*Pharm J*, April 8, 1933.

*On account of lengthy reports other matter had to be omitted from this issue of the JOURNAL.*

#### PERSONAL AND NEWS ITEMS

Hugo Kantrowitz was elected *honorary life member* of the New York Pharmaceutical Association.

Prof. Gustav Bachman, of the University of Minnesota College of Pharmacy, received serious injuries in an automobile accident. While he is making good recovery, he fears that it will prevent his attendance at Madison.

William H. Glover, of the Massachusetts College of Pharmacy, was honored with the degree of Doctor of Pharmacy.

A public square in Cranston, R. I., was named in honor of Clifford E. Tabor, who fell in action in the Argonne Forest. He was a graduate of Rhode Island College of Pharmacy and cited for bravery by General Pershing. Dedicatory ceremonies were held, the principal speaker being Dean W. Henry Rivard.

J. D. Spurrier, of Cleveland, Ohio, has purchased the *Drug Bulletin*, founded in 1879 from E. D. Irvine, well and favorably known member of the AMERICAN PHARMACEUTICAL ASSOCIATION. Mr. Spurrier was with Frederick Stearns & Co. for several years; recently he has been associated with *Ure Druggist*. The publication office has been moved to Cleveland.

We are advised of the death on August 17th, of Mrs. A. L. I. Winne, wife of our fellow member and Secretary of the Virginia Board of Pharmacy and Virginia Pharmaceutical Association. Sympathy is extended

\* From *The Australasian Journal of Pharmacy*, June 10, 1933.

## OBITUARY

## LEO SUPPAN

Leo Suppan professor of Botany and Pharmacognosy in the St. Louis College of Pharmacy, died after a short illness at his home in St. Louis, Mo., July 16, 1933, aged 62 years.

Professor Suppan was born in Jefferson City, Mo., June 7, 1872. He was graduated from the St. Louis College of Pharmacy in 1891, attended the Missouri School of Mines for three years, then the University of New Mexico, where he received the degree, Bachelor of Science. In 1897 he went to Johns Hopkins University for graduate work and, later, studied under Dr. Ernst Schmidt in the University of Marburg, Germany.

In 1903, he became Associate Professor of Chemistry in the St. Louis College of Pharmacy, later, Associate Professor of Pharmacy and in 1922, Professor of Pharmacognosy and Botany, which position he held until the time of his death. In addition to his teaching activities, he was editor of the *National Druggist*. He contributed numerous editorials and papers

on scientific and historical phases of pharmacy. Two of his more recent works are worthy of special mention. "Three Centuries of Cinchona" was published in the "Proceedings Tercentenary Celebration of Cinchona," Missouri Botanical Garden, St. Louis, Mo., in 1931. "A Repetitorium of Pharmacognosy," written in conjunction with Noel M. Ferguson, was published in 1932.

He was a member of the St. Louis Art League, The Oriental Society, The Naturalists' Club, The Archaeological Society of America, the AMERICAN PHARMACEUTICAL ASSOCIATION, the Missouri Pharmaceutical Association. He was one of the founders of the St. Louis Chemical Society in 1903, and served as its secretary for several years.

Professor Suppan was conversant in a number of languages. As an inveterate reader, he acquired a most varied and extensive fund of knowledge. He was beloved by students and associates alike, and has left an imprint on many lives. Pharmacy has been much enriched by the life and work of Leo Suppan.

## SOCIETIES AND COLLEGES

## WISCONSIN MAPS AND INFORMATION

Those coming to Madison by auto will be sent a highway map of Wisconsin on which the pictorial history of the state is drawn by Laura Kremers, daughter of Professor Edward Kremers, if they write for same to Ralph W. Clark, Publicity Committee Chairman, 355 Chemistry Building, Madison, Wisconsin. Please write for any information about the convention to the above address.

## WOMEN'S ENTERTAINMENT PROGRAM (TENTATIVE) MADISON MEETING

Golf Arrangements have been made for the guests.

Monday and Tuesday Morning—Reception of visiting ladies.

Tuesday—Luncheon at Madison Club, 1:00 P.M., followed by visit to State Capitol and Historical Museum. (NOTE: Party will leave Hotel Loraine at 12:45 sharp.)

Wednesday—Luncheon and Card Party at Maple Bluff Country Club, 1:00 P.M. (NOTE: Automobiles will leave Hotel Loraine at 12:30 sharp.)

Thursday—Boat Excursion around Lake Mendota, 9:30 A.M. (NOTE: Automobiles will leave Hotel Loraine at 9:00 sharp.)

Friday—Entertainment by Prof. Kehl's Pupils, 10:30 A.M.—Colonial Room, Hotel Loraine.

Friday Afternoon—Shopping Tours. Visits to Madison points of interest. (NOTE: Committee women will be at Hotel Loraine to conduct our guests.)

Saturday—All day excursion to Devil's Lake and Wisconsin Dells. Three hour boat trip at Dells in afternoon and Indian Pageant in evening.

## OFFICERS OF STATE PHARMACEUTICAL ASSOCIATIONS

*References to other state associations will be supplemented in next issue.*

## FLORIDA

Following the meeting of the Florida Pharmaceutical Association, quite a number of pharmacists visited in and around Atlanta. The pharmacists were greeted by Dr. Andre Perez of the Cuban Pharmaceutical Associa-

tion The entertainments were delightful and much enjoyed by the visitors

### IDAHO

The Idaho Pharmaceutical Association held its annual meeting at McCall, June 26th to 27th The following officers were elected *President* J B Ostrander Wallace, *First Vice President*, Clyde Isenburg, Rupert *Second Vice President* Charles Carter Moscow *Secretary Treasurer* Elmer B Williams, Boise *President* Thoreson recommended revision of the State pharmacy law the California Fair Trade bill was endorsed Lewiston was chosen as the meeting place for 1934

### MAINE

A feature of the meeting of Maine Pharmaceutical Association was the Round Table discussion The officers for the ensuing year are *President* Burton K Murdock Kennebunk *First Vice President* Ralph A Lockhear, Auburn *Second Vice President*, Horace T Poland Damariscotta *Third Vice President* Ralph C Trescartin Phillips, *Secretary* James H Allen Waterville *Treasurer* George O Tuttle Portland

### MISSISSIPPI

Following its regular custom the association elevated G C Roberts of Greenwood from the *First Vice Presidency* to the *President's office*, raised Lew Wallace of Laurel from *Second* to *First Vice President*, elected J S Puller of Starkville *Second Vice President*, and unanimously reelected Dr S B Key of Jackson, *Secretary Treasurer* The new executive committee is composed of Retiring *President* McInnis F W Duckworth, Booneville and Joe A Moss Jackson

As the concluding business of the convention the association voted by a four to one majority to return to Jackson in 1934 The record attendance splendid program offered and gala round of social functions were asserted factors that brought the enthusiastic support of Jackson's invitation

### MISSOURI

Quite a number of valuable papers were read at the meeting of the Missouri Pharmaceutical Association and a series of resolutions adopted covering subjects of timely interest The

following officers were elected *President* Joe Knight, Lebanon, *First Vice President* George C Eby, Kansas City, *Second Vice President*, John Emerson Joplin, *Third Vice President* John J Mueller St Louis, *Treasurer* Murray Q Williams, Warrensburg *Historian*, Ambrose Mueller, Webster Groves *Secretary*, W H Lamont 5838 Plymouth Ave St Louis *Honorary President*, E A Sennewald St Louis

### MONTANA

Montana Pharmaceutical Association discussed the adoption of a poison register as a move to protect public health Helena was selected for the 1934 convention city

The following officers were elected *President* H E Rakeman, Jr, Ennis *First Vice President*, Emil Schoenholzer Billings *Second Vice President* Donald Wilson Forsyth *Third Vice President* Howard Craig Drummond, *Treasurer*, C A Challman Hobson *Secretary* J A Riedel, Boulder

### OHIO

The Ohio Pharmaceutical Association held its annual convention on the S S Juniata taking in the World's Fair in Chicago At the close of the convention, the following officers were elected *President* Charles Ehlers Cincinnati *First Vice President* Thomas J Ryan, Columbus, *Second Vice President* Clark A Bloom Youngstown, *Treasurer* L W Funk, Columbus, *Secretary* Theodore D Wetterstrom Columbus

### TENNESSEE

Tennessee Pharmaceutical Association held its sessions in Chattanooga July 18th and 20th A new Constitution and By laws were adopted An NRA code was discussed and approved Among the speakers of the Convention were Prof Paul C Olsen and Dr James L Bibb of the Hamilton County Medical Society The provision of the new constitution is that a special one day meeting of the Association be held in Nashville during the meeting of the state legislature, at which time only legislative problems are to be discussed

Knoxville was selected for the 1934 meeting and the following officers were elected *President* Leslie F Mitchell Nashville *First Vice President* R R Ferrell Memphis, *Second Vice President* L S Elgin Knoxville

*Thrd Vice President*, P P Vance Chatta  
*nooga Secretary* William P Winter Nashville  
*Treasurer* H J Berryhull Jackson

(To be continued)

# TENTATIVE PROGRAM OF JOINT SESSION OF SECTION ON EDUCATION AND LEGISLATION WITH CONFERENCE OF LAW ENFORCEMENT OFFICIALS AND CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

## TOPICS

The Pharmacy Board as the Sole Regulatory Body for Pharmacy " R P Fischelis

A Legislative Attempt to Restrict the Opening of New Drug Stores ' H P Berne

Reports on Enacted and Proposed Legislation Affecting Pharmacy in Various States

Alabama, S A Williams, Connecticut, H P Berne, Colorado C J Clayton, Georgia, R C Wilson Maryland R L Swain Michigan C F Allen New Jersey R P Fischelis Pennsylvania J M Woodside West Virginia J L Hayman

## TENTATIVE PROGRAM SECTION ON COMMERCIAL INTERESTS

The Prescription Defined ' Anton Hogstad Jr

Keeping of Records ' Walter Scharbach

Relation of Professional Pharmacy to the Drug Institute of America ' Paul C Olsen

Professional Pharmacy ' Robert Gaw

Publicity and the Pharmacist ' Alice Esther Garvin

Profits and Prophets, ' C Leonard O Connell

Actual Time and Costs of Some U S P and N F Preparations " Henry Brown

National Drug Store Survey Speakers from the U S Department of Commerce Drug Retailing, " Charles F Beach

Pharmacy, ' William Rodman

## THE PHARMACY EXHIBIT

BY H C CHRISTENSEN

The Pharmacy Exhibit is located on the ground floor of the Hall of Science in the Medical group The easiest method of finding it is to locate the Transparent Man The Pharmacy Exhibit is on the circular corridor to the left This is the north end of the building

The history of the exhibit is briefly A Local Committee was formed in Chicago, with H C Christensen as chairman, to see that Pharmacy was properly represented at the Fair The space 1700 sq ft with a commercial value of \$17 000, was donated by the Fair officials, upon pledge of a proper exhibit The AMERICAN PHARMACEUTICAL ASSOCIATION was named sponsor and signed the contracts The Local Committee not only planned and supervised the installation of the exhibit but also raised the necessary funds from all branches of pharmacy A great share of the credit for fund raising goes to the very efficient treasurer J H Riemenschneider, Dr Frank H Kirby carried out the duties of the secretary most faithfully

Photographs and descriptions of the exhibit have appeared in the leading journals See it for yourself Register at the desk as we want a complete record of all those connected with the drug industry who have visited the Pharmacy Exhibit

Miss Esther H Barney, registered pharmacist and superintendent of the Exhibit will be in charge Miss Barney is well informed on matters pertaining to the Fair and is a genial hostess

## CANADIAN PHARMACEUTICAL ASSOCIATION

An interesting program has been arranged for the Canadian Pharmaceutical Association convention to meet at Montreal August 21st to 24th and we wish for our Canadian friends a most successful meeting Our only regret is that their meeting is held so near to the time of that of the AMERICAN PHARMACEUTICAL ASSOCIATION as we are fearful it may interfere with the attendance from Canada It has always been a pleasure to have representatives present at the annual meeting and we hope to see a number in attendance at Madison Prof Charles F Heebner of Toronto is the *Honorary President* of the AMERICAN PHARMACEUTICAL ASSOCIATION

## THE BRITISH PHARMACEUTICAL CONFERENCE

The 70th annual meeting of the British Pharmaceutical Conference was held in London July 24th to 27th The *Pharmaceutical Journal* comments that this year's meeting of the British Pharmaceutical Conference is

noteworthy in many respects. The meetings of the Conference are held every ten years in London and special pains were taken by the Local Committee to mark the importance of the occasion. The Editor has been favored with a program and other illustrated literature of the event. The program is a work of art depicting London and its buildings showing St. Paul's Church and the River Thames. The cover illustration presents a view of London of 1616 reproduced from a print in the London Museum. The title page has as a design an 18th century pill slab bearing the arms of the Society of Apothecaries and of the city of London.

Succeeding pages show President John Keall and Chairman C. H. Hampshire of the British Pharmaceutical Society and British Pharmaceutical Conference. Another page contains a welcome to London by the chairman of the London Committee, A. R. Melbush. A full-page illustration is that of an engraving by J. G. Murray of the painting by W. Hunt, in 1840 of the Laboratory of John Bell & Co., London, reproduced last year in the JOURNAL. A. P. H. A. Three pages are given over to social functions and one page to the chair presented by the pharmaceutical societies of Australia and New Zealand at the delegates meeting on Wednesday, July 26th. (See page 661, July JOURNAL.)

A full-page illustration is shown of a drug mill of the Apothecaries Company in 1788, situated in Lambeth Walk from a painting by Miss M. L. Worley in the possession of the Society of Apothecaries. Four succeeding pages contain illustrations of a mortar inscribed "C. R." and dated 1664, possibly by N. le Febvre, apothecary to Charles II. Drug jar with the arms, crest, mantling and motto of the Apothecaries Company of London, in blue, green, yellow and turquoise. About 1650-1660. Mortar inscribed "Henry Knight, 1618" around the lip and the band around the waist. George Millsent. Cast at Reading. Mortar bearing the date 1663 and the name "John Battersby the physician of Samuel Pepys" and the last page shows the old Plough Court Pharmacy, London, built about 1607.

Among the speakers at the banquet were President John Keall, Chairman Dr. C. H. Hampshire and Dr. J. J. Hofman, president of the International Pharmaceutical Federation. Australia, Belgium, Denmark, France, Germany, Holland, New Zealand, Roumania, South Africa, Spain, Switzerland and Sweden were represented by delegates.

## PUBLICATIONS RECEIVED

*We are in receipt of the following:* A memorial number prepared by the Apothecaries Society of Nurnberg and vicinity, commemorating the period between 1632 and 1932. The booklet is illustrated and aside from dealing with the activities of the apothecaries contains historical references to the city, outstandingly, however, the booklet is concerned with pharmaceutical history.

Reprint contributions to the knowledge of the constituents of *Orthostaphion stamnus* Benth., an inaugural dissertation in preparation for the Ph.D. degree by CHARLES FÉVRIER, apothecary at Neuchâtel. The dissertation contains nearly sixty printed pages and the author thanks members of the faculty, Dr. P. Casparis, Dr. H. Zornig and Dr. Buxtorf.

*Pharmaceutical Analyses* by DR. C. A. ROJAHN, a contribution from the Institute of Pharmacy and Food Chemistry of the University of Halle, reprinted from the *Pharmazeutische Zeitung* 1932, volume 77, page 866.

The analyses concern those of secret remedies. The Analyst has drawn on "Geheime Codex" and other lists of that type for the sources of his research. Eighty-seven classes, each comprising a large number of preparations, are given and speak for the extensive work conducted by Dr. Rojahn.

*Biochemical Researches on the Glucosides of Chamomile Flowers* by DR. CH. BEGUIN, at the University of Zurich, published in the *Pharmaceutica Acta Helvetica*, December 12, 1932. The reprint covers thirty pages.

A booklet on the scientific works of Dr. M. Albert Goris, director of the Pharmacy of the Central Hospital of Paris and professor of Galenic Pharmacy of the Faculty of Pharmacy at Paris. The booklet reports the honors which have been bestowed on Dr. Goris and the positions held by him at various periods.

Abstracted references are made of numerous scientific articles and the subjects are quite varied. Thus there are researches in biochemistry, culture of medicinal plants, collective and on individual subjects, studies on fluid extracts, syrups, etc.

Reprint from the *Pharmazeutische Zeitung* on "The Manufacture of Tablets." It is published in book form, the author being ERICH SCHROFF. The publishers are Julius Springer, Berlin, Germany. The price is 90 Rm.

(To be continued)

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXII

SEPTEMBER 1933

No 9

## THE HONORARY PRESIDENT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION FOR 1933-1934

Edward Kremers, son of Gerhard and Elise (Kamper) Kremers, was born in Milwaukee, Wis., February 23, 1865. After serving an apprenticeship, he entered the Philadelphia College of Pharmacy (1884) and, returning to Madison, earned his B S degree at the University of Wisconsin (1888). Under the leadership of the late Dr. Frederick B. Power he began his researches on volatile oils and photochemistry. "this inspirational influence" prompted him to carry on his studies under Dr. Wallach at the University of Bonn, then the outstanding authority in terpene chemistry, and when the latter left this institution to take up duties at the University of Gottingen, Edward Kremers, with other students, followed Dr. Wallach to his new charge. Here, in 1890, our honored member was awarded the Ph D degree, his dissertation being on "The Isomerism within the Terpene Group," which subject was the foundation of many later researches.

Dr. Kremers, on invitation of Dr. Power, returned to the University of Wisconsin as a member of the pharmaceutical faculty, in 1892, he was elected to the chair of pharmaceutical chemistry, and when Dr. Power resigned to take up other work, Dr. Kremers was elected his successor, and has rendered faithful and productive service during more than forty years. During this period the Wisconsin Pharmaceutical Experiment Station was founded and promoted and, through his efforts, practical pharmacognosy has found a permanent place in the pharmaceutical curriculum and "the garden has been made an adjunct to the textbook and the lecture room." He established the first graduate work in America leading to the Ph D degree for plant chemistry and for pharmacy.

Dr. Kremers has contributed largely to pharmaceutical, chemical and historical literature, listing the titles of his many contributions would extend the limits of this incomplete sketch, his historical articles present a fund of information. "American Men of Science" gives a hurried reference to some of his investigations. "Chemistry of volatile oils and their constituents, sesquiterpenes and derivatives, quinhydrone as plant pigments, bibliography of the chemical constituents of volatile oils, classification and occurrence of the constituents of vola-

tile oils according to modern principles, the *Monardas*, a phytochemical study, classification of carbon compounds" The PROCEEDINGS and JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION report many of his pharmaceutical researches. He has been associated in an editorial capacity with several publications, notably the *Pharmaceutical Review* and *Pharmaceutical Archives*. He was co editor of the "National Standard Dispensatory," and is the author of the English edition of "The Volatile Oils"—Gildermeister-Hoffmann-Kremers.

Oswald Schreiner, writes of our distinguished member in *Industrial and Engineering Chemistry* relative to his association with the young men and women who studied under him and were privileged to enjoy the hospitalities of the home of Dr and Mrs Kremers at "Highlands," on Mendota's lovely hills. "The undergraduate became the devoted disciple in his graduate years, as in these delightful gatherings Dr Kremers' enthusiasm and devotion to science were imparted with inspiration to his student guests, his lectures at the University were replete with the learning of alchemists, sage and scientist, and crowded with facts, but these quiet social hours revealed the true greatness and heart of the man and are counted among the treasured hours of memory by hundreds of his old students." Those who have visited this beautiful home can understand the influence on the students of this social contact as inspiring, for he is a wise and helpful counselor.

Dr Kremers was a member of the Revision Committee of the United States Pharmacopœia, 1900-1910, and his researches have been helpful in the revision of the Standards and to the authors of textbooks.

In 1887, Edward Kremers became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION, in 1897-1898, he was chairman of the Scientific Section, when the Committee on Historical Pharmacy was founded he was elected historian and served in that capacity after the Committee became a Section of the ASSOCIATION, until 1912. He was president of the American Conference of Pharmaceutical Faculties in 1902, of the Wisconsin Pharmaceutical Association in 1930. He was awarded the Ebert Prize in 1887 and again in 1900, and received the Remington Honor Medal in 1930.

The Honorary President is an activating influence in historical research and has contributed largely to the Wisconsin Society, he impresses the members with pharmacy's part in the development of the state—the Historical Drug Store is an outstanding example. His collection of books and historical material evidences an acquaintance with pharmaceutical history that reveals the mind of a systematic collector and the ability to portray history, not only in his writings but by assembling facts of history in his selections.

Dr Kremers is a member, honorary and active, of a number of societies in Europe and America, among them, Societe d'Histoire de la Pharmacie, Gesellschaft für Geschichte der Pharmazie, American Chemical Society, Society for the Advancement of Science, Wisconsin Academy of Science and Letters, honorary member of the German Pharmaceutical Society, etc. He received the degree of *Sc D honoris causa* from the University of Michigan.

July 6, 1892, Edward Kremers and Miss Laura Haase, of Milwaukee, were married, three children are living, two daughters and a son. The latter is Dr Roland E. Kremers, of Battle Creek, Mich., a member of the AMERICAN PHARMACEUTICAL ASSOCIATION.



# EDITORIAL

E G EBERLE, EDITOR

10 West Chase Street, BALTIMORE, MD

## PHARMACY WEEK

"MEDICINE is as old as the human race, as old as the necessity for the removal of disease." There is much for the pharmacist in this thought as credited to Haeser in relation to the Pharmacy Week movement, for pharmacy has run a parallel course with the history of mankind and that of the profession of medicine. Pharmacy Week does not have for its purpose that of a comprehensive publicity stunt or a ballyhoo proposition.

There is a deep significance to Pharmacy Week—the monument as erected by the late Dr. Robert J. Ruth. In the procession of mankind down through the ages pharmacy has occupied an important rôle and has contributed much to the relief of those suffering with bodily ailments. The dust-laden archives of our time-honored profession are filled with glorious achievements on the part of pharmacists. Let us pause for a moment or two and reflect on the thought that three of the greatest of all gifts tendered mankind represent the labors of pharmacists. These three great gifts are Morphine, Quinine and Iodine, as respectively discovered by Serturner, Pelletier and Caventou, and Courtois.

Pharmacy has much to be proud of and we should do everything within our power to safeguard this truly valuable heritage at all times. In order to safeguard this heritage we must at all times conduct ourselves as pharmacists, for it must be remembered that the character of a pharmacist is best perhaps defined as "the sum-total of his or her daily conduct."

In presenting the story of Pharmacy to the world at large let us see to it that the sum-total of our daily activities is of such a character as to be an honor and a credit to the profession.

In the presentation of a professional window display let us see to it that the institution in general and more specifically, that of the prescription room, are in keeping with these thoughts. One should begin with the prescription department, to place same in order before proceeding to a window display for according to an old German saying (when translated), "In the eyes one sees the heart."

Let us keep the spirit of the fine art of the Apothecary aglow with the fine traditions of this noble heritage with which we of the present generation have been entrusted. It is first necessary to see to it that one's attitude is correct. Are you proud of the fact that you have been privileged to become a member of this time-honored fraternity?

Pharmacy Week affords the retail pharmacist and all others associated with the profession an excellent opportunity of going forth to preach this gospel of romance and glorious achievements. The science of chemistry as well as the profession of medicine has been quite active in this connection. The many thousands of window display spaces at the command of pharmacy afford us an unusual opportunity of presenting our accomplishments in a forceful manner. A professional window display in addition to being attractive should carry with it a deep significance. In connection with window displays it is best to select one subject and stick

to it throughout Don't confuse the mind of the public with a heterogeneous collection of this and that which is lacking in significance

Make arrangements now to appear before the various organizations in your community during Pharmacy Week Human interest-appeal stories can be obtained free of charge by addressing the National Pharmacy Week Executive Committee at 161 Sixth Ave., N. Y.—ANTON HOGSTAD, JR

---

## TELL ABOUT YOUR SERVICE AND ABOUT YOUR WARES BUT NOT IN THE SAME MESSAGE

IN A recent issue of *Review of Reviews* Roger W. Babson discusses the value of the Show Window in an article entitled "Put Your Wares in the Window" He contends that buyers must be persuaded to purchase by persistent publicity and salesmanship

He holds that intrinsic worth of merchandise is essential but not enough, goods must be sold to the prospective buyer by acquainting him or her with the value of them and this requires intelligent salesmanship Mr Babson argues that the public buys best when merchandise is brought effectively to its attention through advertising and when the merits of the goods are carefully explained by an alert salesman to a prospective customer

In a related way publicity for pharmacy is brought to the attention of the public by a window that tells of applied pharmacy, the detail of manufacturing, the sources of supply—impressing the need of accuracy

The visitors at the Century of Progress prove that the public is deeply interested in the service rendered by pharmacists, there need be no further question regarding the value to be derived from telling the story of pharmacy, but such a window must be kept free from merchandise, any attempt to display professional service with unrelated sales items destroys the effectiveness of the display and does injury to the store

Instructive exhibits were on display at the Madison meeting, prepared by Chairman E. Fullerton Cook, of the Revision Committee of the U. S. Pharmacopœia, Chairman E. N. Gathercoal, of the National Formulary, and Chairman J. Leon Lascoff, of the Pharmaceutical Recipe Book

---

## COMPLETION OF RETAILERS' CODE DELAYED

THE Code, as far as pharmacists are concerned, remains the same and there is assurance that there will be no change The Master Code for the retail stores is delayed, largely because General Johnson has not reviewed it and the Central Statistical Board is studying prices in connection with wages While druggists will have a separate code, they are interested in the retailers' code as it affects other sales in the drug store Price-fixing and price maintenance, as defined in the proposed code for the retail trade, may be changed before the code is perfected and accepted It is needless to comment at this time when there is still uncertainty, nor present views that may not be accepted and confuse rather than prove helpful However, changed provisions are embodied in this comment

The purpose of the *Stop Loss Provisions* of Section one are intended to check 'predatory price cutting and minimize retail operating losses resulting therefrom, and in order to assure that the retailer shall be at least partially compensated for the service he renders the consumer, on and after the effective date of this code no retailer shall offer for sale, sell, exchange or give away any merchandise, except as provided hereinafter below a minimum price, which shall be the wholesale delivered price as hereinafter defined with the addition of a charge of ten (10) per cent

' No retailer shall sell standard trade marked drug products whose retail prices are advertised to the public or indicated on the goods their packages or containers, at a discount greater than twenty one (21) per cent from such declared retail prices. In case the retail sales of such goods are slow or unsatisfactory the retailer may give the manufacturer or wholesaler from whom such goods were purchased if his address be known, the opportunity to repurchase such merchandise at the wholesale delivered price as hereinafter defined less delivery cost

Wholesale delivered price as used herein means the lowest price offered to all members of the retail trade within thirty (30) days prior to date of resale to all retailers of any given division of retail trade less only such discounts as are extended to all such retailers and plus delivery costs " (There may be changes in the foregoing )

After all, the success of a code depends on the desire and willingness of those affected to carry on. There must also be cooperation of those in the same group and hence the AMERICAN PHARMACEUTICAL ASSOCIATION seeks to work with the National Association of Retail Druggists and retail druggists generally, and representatives of these Associations have been in Washington during the considerations given to the codes. It is reasonable to assume that before the end of the month definite conclusions will be reached, when facts can be given instead of possibilities or probabilities

---

#### THE EIGHTY-FIRST ANNUAL MEETING OF THE A P H A

THE program of the General Sessions of the Madison meeting was enhanced by the address of Dr W G Campbell, Chief of the Food and Drug Administration. He gave the members an understanding of what is proposed by the revision of the Food and Drugs Act, and a resolution dealing with the subject was presented in the House of Delegates and adopted by the ASSOCIATION—See Resolution No 4

The members were greatly pleased with the report of Chairman H A B Dunning on the Headquarters—a number of photographs by S L Hilton and others, showing the progress of the building were exhibited. Further efforts were interestingly explained and the responsibilities and opportunities of the members were stressed.

Chairman H C Christensen reported on the Pharmacy Exhibit at Chicago, and enlisted interest in its behalf, he received the applaud of the membership and a resolution of thanks was conveyed to him and others of the committee whose efforts made the exhibit possible.

The exhibit and symposium on professional pharmacy was a great success and impressed the importance of this work on the members. Represented in the exhibit were preparations of the Pharmacopœia, a display of the details of pharmacopœial revision, a similar display was shown of the National Formulary together with surveys for determining the extent of use of official preparations and other *Materia Medica* in prescription practice. The exhibit of the Recipe Book preparations showed the possibilities of bringing these to the attention of physicians. Chairman E Fullerton Cook, E N Gathercoal and J Leon Lascoff received many favor-

able commendations and the hope was quite generally expressed that such a symposium should be made part of next year's program

The West won many honors this year—Dr H A Langenhan and Ewin Gillis, of Seattle, won the Ebert Prize for their paper on Hydrastis, Ivor Jones, of Seattle, the Fellowship of the National Conference of Pharmaceutical Research, and Miles Edward Drake, of Corvallis, Oregon, the Fairchild Scholarship

The several bodies transacted their business with dispatch and the addresses of presiding officers are given in this issue of the JOURNAL and also the transactions of the Council

All of the Sections received a liberal number of papers, as also the Conferences, and the latter held a joint session with the Section on Education and Legislation for the discussion of enacted and proposed legislation The success of this session has suggested a meeting on similar lines for next year The officers and members of the American Council on Pharmaceutical Education held several sessions in outlining their work

The Plant Science Seminar convened during the week preceding that of the ASSOCIATION, the National Conference on Pharmaceutical Research on the Saturday preceding, the National Association of Boards of Pharmacy and Association of Colleges of Pharmacy on Monday and Tuesday of Convention Week The roster contains a list of new officers and the reports of the various sessions will be published in the usual order and, therefore, no mention other than the foregoing is made at this time

It is regretted that several of our former presidents were absent on account of sickness, or taken ill after arriving in Madison, among them were Frederick J Wulling, C Herbert Packard, Charles H LaWall (absent on account of Mrs LaWall's poor health), H H Rusby C W Johnson had to return home because of sickness and L L Walton was taken ill soon after his arrival in Madison, both are recovering The entertainments for the ladies were many, including luncheons, receptions, card parties, excursions on Lake Mendota, visits to the capitol, University, shopping tours, etc Aside from these functions there were dinners and the annual banquet and the fraternity luncheons and dinners

Dr and Mrs Edward Kremers entertained the members of the Plant Science Seminar at their home "The Highlands," an additional feature was a Campfire Talk by Dr C E Brown, Curator of the Historical Museum Dr and Mrs Kremers also entertained the members of the ASSOCIATION at their home Un doubtedly there have been omissions in making these brief references and pardon is asked Other individuals should be mentioned, but this would lead to other omissions, therefore a general expression of appreciation will have to answer

Saturday (September 2nd) was the outstanding day of the week, including an excursion to the dells of the Wisconsin River, beautiful and scenic, and an Indian Pageant held in Natural Outdoor Theatre closed the day

To do justice to the beautiful scenes, and give expression to the story told by the Indians, is not possible by this writer as it would require more space than available in this issue of the JOURNAL

Coming to a conclusion, the meeting in Madison was a success in every way, the hosts arranged most delightful programs and to all who shared in arranging the entertainments our sincere thanks and appreciation are extended

## SCIENTIFIC SECTION

BOARD OF REVIEW ON PAPERS—*Chairman*, L. W. Rowe, John C. Krantz, Jr., F. J. Bacon

### THE PHARMACOLOGICAL ACTION OF TEN AMINES RELATED TO EPHEDRINE AND TRYPTAMINE \*

BY K. K. CHEN AND A. LING CHEN

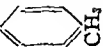
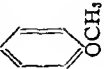
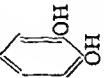
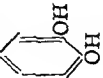
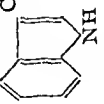
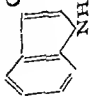
In 1929 one of us (K. K. C.) in association with Wu and Henriksen (1) reported results on a series of 27 amines related to ephedrine and drew certain conclusions regarding the relationship between pharmacological action and chemical constitution. Since then 10 additional amines have been made available to us, and a similar investigation has been carried out with them on animals. As shown in Table I, the first 4 substances are ephedrine derivatives and the next 5 contain an indole ring. The last member, *cino-bufotenine*, is a constituent of the Chinese toad poison *Ch'an Su*, raises the arterial blood pressure and has been shown by Jensen and Chen (2) to be an amine derived from an indole. The chief object of this paper is to furnish (a) a comparison of the physiological activity of the different compounds with particular reference to epinephrine and ephedrine, and (b) a further elucidation of the relationship between chemical structure and pharmacological effects.

Of the 10 compounds listed in Table I, we are indebted to Dr. R. H. F. Manske, National Research Council, Ottawa, Canada, for Nos. 6, 7, 8 and 9, to Dr. O. Schaumann, I. G. Farbenindustrie A. G., Frankfurt a. Main-Hoechst, Germany, for Nos. 3 and 4, to Dr. R. W. Jackson, Yale University, New Haven, for No. 9, and to Dr. W. H. Hartung, Sharp and Dohme, Baltimore, for Nos. 1 and 2. We also wish to acknowledge our gratitude to Dr. H. Jensen, Johns Hopkins Medical School, for suggestions of study and for his assistance in securing hypaphorine and the four tryptamines from the proper authorities. *Cino-bufotenine* was prepared by ourselves as a flavanate.

Before the presentation of the data, a brief résumé of the status of these compounds may be desirable. Both *p*-methyl- and *p*-methoxy-*nor*-ephedrine have been shown by Hartung and his associates (3) (4) (5) to have a weaker pressor action than phenylpropanolamine. Compound No. 3, 3,4-dihydroxy-*nor*-ephedrine, was suggested for further study by Chen, Wu and Henriksen (1), and reports have since been made by Schaumann (6), Raymond-Hamet (7), Hartung and his associates (5) and Tanter (8). Compound No. 4, 3,4-dihydroxy-ephedrine, is relatively new, and its physiological effects have been studied by Schaumann (6) and Raymond-Hamet (7). Tryptamine, or indole-ethylamine, has been subjected to animal experimentation by Ewins and Laidlaw (9), Guggenheim and Löffler (10), and Guggenheim (11). The methyl derivatives of tryptamine are the results of Manske's recent work (12). Hypaphorine occurs in the seeds of *Erythrina hypaphorus* (13) or *E. variegata* var. *orientalis* (14), and its synthesis has been perfected by Romburgh and Barger (15). A metabolic investigation with this product has been made by Jackson (16). Hypaphorine is of special interest in the present series because Wieland, Hesse and Mittasch (17) believe that it is closely

\* From the Lilly Research Laboratories, Eli Lilly and Company, Indianapolis.

TABLE I —PHARMACOLOGICAL ACTIVITY OF COMPOUNDS RELATED TO EPHEDRINE AND TRYPTAMINE

Com- pound No	Name	Formula	M. P. ° C Corrected	Pressor Action in Pithed Cats	Rabbit's Pupil	Isolated Rabbit's Intes- tine	Isolated Guinea Pig's Uterus
1	<i>p</i> Methyl <i>nor</i> ephedrine HCl		205-206	+	Dilated	Slightly stimu- lated	Stimulated
2	<i>p</i> Methoxy <i>nor</i> ephedrine HCl		224-5	+	No response (4% solution)	Slightly stimu- lated	Stimulated
3	3,4-Dihydroxy <i>nor</i> ephedrine HCl		179-180	1/10 of epi- nephrine	Definitely di- lated	Inhibited	Stimulated
4	3,4-Dihydroxy-ephedrine HCl		189	1/10 of epi- nephrine	Definitely di- lated	Inhibited	Stimulated
5	Tryptamine HCl		252-253	+++	No response	Slightly stimu- lated	Stimulated
6	Methyl tryptamine HCl		180	++	No response	Slightly stimu- lated	Stimulated

	Hygroscopic	+	No response	Slightly stimu- lated	Stimulated
7 Dimethyl tryptamine HCl					
		<chem>CC1=CC=C2C(=C1)C(=CN2)CCN(C)CC1=CC=C2</chem>			
8 Trimethyl tryptamine Am- monium Iodide	197	$\frac{1}{10}$ of epi- nephrine	No response	Definitely stimu- lated	Stimulated
		<chem>CC1=CC=C2C(=C1)C(=CN2)CCN(C)CC1=CC=C2</chem>			
9 Hypaphorine	238	No response	No response	No response	No response
		<chem>CC1=CC=C2C(=C1)C(=CN2)CC(=O)O</chem>			
10 Cino bufotenine Flavinate	200 5	$\frac{1}{10}$ of epi- nephrine	Slightly con- stricted	Definitely stimu- lated	Stimulated
		<chem>CC1=CC=C2C(=C1)C(=CN2)CCN(C)CC1=CC=C2</chem>			

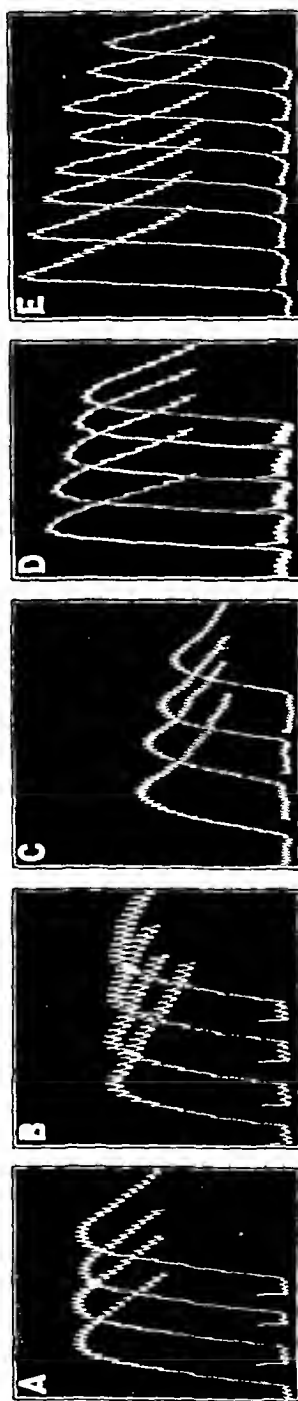


Fig 1 —Action on blood pressure by repeated injections with five amines

- A 3,4 Dihydroxy nor ephedrine HCl, 1 5000 0 4 cc for each injection in a pithed and vagotomized cat female weighing 1 78 Kg  
 B 3,4 Dihydroxy ephedrine HCl 1 500 0 4 cc for each injection in a pithed and vagotomized cat, female weighing 2 088 Kg  
 C Tryptamine HCl, 1 500 0 4 cc for each injection in a pithed and vagotomized cat female weighing 2 552 Kg  
 D Trimethyl tryptamine ammonium iodide, M/320 (ea 1 1000), 0 4 cc for each injection in a pithed and vagotomized cat female weighing 1 746 Kg  
 E Cino bufotenine flavinate, 1 4000, 0 8 cc for each injection in a pithed and vagotomized cat, male, weighing 3 3 Kg

related to cino-bufotenine ("bufotenidine") If that were the case, it might also be expected to have a pressor action like cino-bufotenine (18)

The present investigation comprises studies with the above products on the blood pressure in pithed cats, and on smooth muscle organs—rabbits' pupils, isolated guinea pigs' uteri and rabbits' intestines On several occasions, perfusion experiments were made in frogs to determine the cardiac or vascular changes The results are summarized in Table I

#### A PRESSOR ACTION

The rise of blood pressure as observed in pithed cats is probably the best indicator of the inherent property of amines of this group In two experiments, it was found that both *p*-methyl- and *p*-methoxy-*nor*-ephedrine had only a trace of pressor action When compared equimolecularly with *nor*-ephedrine and *p*-hydroxy-*nor*-ephedrine, they were shown to be much less active It is thus clear that the replacement of H on the benzene ring at the *p*-position, or on the OH group at the *p*-position, by a simple alkyl group such as a methyl radical is unfavorable to the pressor action

3,4-Dihydroxy-*nor*-ephedrine (racemic) is the most powerful of the whole list In 10 pithed cats, the average pressor action was determined to be  $\frac{1}{4}$  that of epinephrine A 1:5000 solution of 3,4-dihydroxy-*nor*-ephedrine matched very closely with one of 1:20,000 of epinephrine in the majority of animals Unlike ephedrine, with this synthetic product there is no prolongation of action and no loss of effectiveness on repeated intravenous injections (see Fig 1)

The same ratio of activity between 3,4-dihydroxy-*nor*-ephedrine and epinephrine, that is, 1:4, was obtained by perfusion experiments in frogs for cardiac stimulation or vaso-constriction The minimal concentration of 3,4-dihydroxy-*nor*-ephedrine that increased both the rate and the amplitude was 1:2,500,000, while that of epinephrine which produced the same effect was 1:10,000,000 Similarly, the minimal effective concentration of the former for vaso-constriction was 1:2,000,000 and that of the latter 1:8,000,000 It has been our impression that the vaso-constricting action in frogs of 3,4-dihydroxy-*nor*-ephedrine is relatively less prompt than that of epinephrine

Tainter (8) and Hartung and co-workers (5) working with Hartung's product concluded that 3,4-dihydroxy-*nor*-ephedrine has  $\frac{1}{12}$  the activity of epinephrine, or indirectly, it is  $\frac{1}{3}$  as active as the German preparation which we studied It is possible that Hartung's compound had not attained its highest purity since he stated that he had failed to find a suitable solvent for recrystallization (5)

Compound No 4, 3,4-dihydroxy-ephedrine (racemic), is  $\frac{1}{10}$  as active as 3,4-dihydroxy-*nor*-ephedrine, or  $\frac{1}{40}$  as active as epinephrine, but is decisively more powerful than ephedrine in animals by intravenous injections In 10 pithed cats, a small volume (say 0.4 cc) of a 1:500 solution of 3,4-dihydroxy-ephedrine caused practically the same rise of blood pressure as that produced by an equal volume of a 1:5000 solution of 3,4-dihydroxy-*nor*-ephedrine, or a 1:20,000 solution of epinephrine Like the latter, 3,4-dihydroxy-ephedrine has a brief action, and repeated administration does not diminish the sensitivity of animals to it, as shown in Fig 1

Of the four tryptamines, the order of activity on the blood pressure was found to be as follows dimethyl-tryptamine < methyl-tryptamine < tryptamine < tri



methyl-tryptamine ammonium iodide Four cats were used in the determination The fact that tryptamine is stronger than methyl- and dimethyl-tryptamines, and 3,4-dihydroxy-*nor*-ephedrine stronger than 3,4-dihydroxy-ephedrine, is in keeping with our previous observation (1) that primary amines are more powerful than secondary or tertiary amines The ammonium iodide of trimethyl-tryptamine has a marked pressor action An  $M/320$  solution matched very closely in two pithed cats a 1:20,000 solution of epinephrine—making the ratio of activity approximately 1:21 This increase of potency is to be expected for Barger and Dale (19) discovered some time ago that the quaternary ammonium salts are much more powerful than the corresponding less highly methylated amines They further observed that these substances have a nicotine-like effect The quantity of the present compound available was not sufficient to permit a thorough study, but *a priori* one would be tempted to assume that it would have the same type of action, that

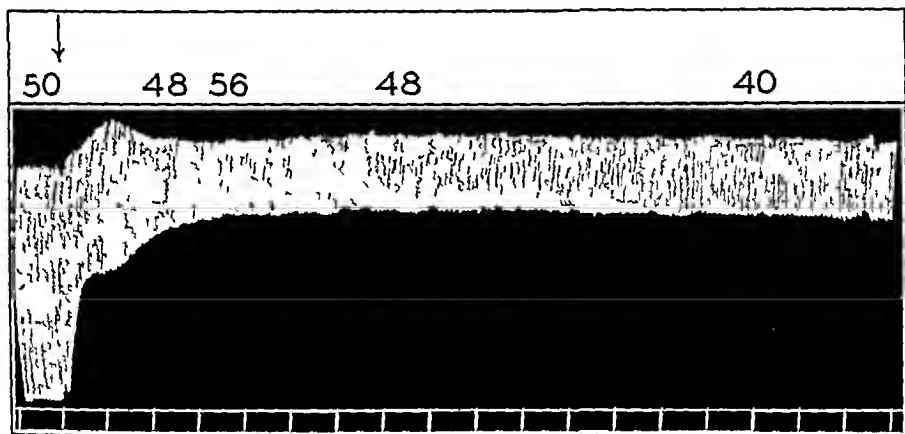


Fig 2—Action of trimethyl tryptamine ammonium iodide on frog's heart

Frog male weighing 69 Gm and pithed, was perfused (at arrow) through the inferior vena cava with a 1:5000 solution of trimethyl tryptamine ammonium iodide The figures refer to ventricular rates per minute

is, a nicotine-like effect Both tryptamine and trimethyl-tryptamine ammonium iodide gradually lose a small fraction of their blood pressure raising property upon repeated intravenous injections (Fig 1)

Hypaphorine in the dosage of 5 mg did not raise the blood pressure, while cino-bufotenine in the form of a flavianate has  $1/10$  the pressor action of epinephrine (18) Thus appears to indicate that cino-bufotenine is more likely a derivative of tryptamine than of hypaphorine Furthermore, trimethyl-tryptamine ammonium iodide, like cino-bufotenine, has a tendency to increase the tone of the frog's heart when perfused through the inferior *vena cava*, as shown in Fig 2 There is also a gradual diminution of the action on the blood pressure with cino-bufotenine (see Fig 1)

#### B ACTION ON SMOOTH MUSCLE ORGANS

From Table I, it may be noted that, with the exception of *p*-methoxy-*nor*-ephedrine, other ephedrine derivatives all have a mydriatic action The results in

related to cino-bufotenine ("bufotenidine") If that were the case, it might also be expected to have a pressor action like cino-bufotenine (18)

The present investigation comprises studies with the above products on the blood pressure in pithed cats, and on smooth muscle organs—rabbits' pupils, isolated guinea pigs' uteri and rabbits' intestines On several occasions, perfusion experiments were made in frogs to determine the cardiac or vascular changes The results are summarized in Table I

#### A PRESSOR ACTION

The rise of blood pressure as observed in pithed cats is probably the best indicator of the inherent property of amines of this group In two experiments, it was found that both *p*-methyl- and *p*-methoxy-*nor*-ephedrine had only a trace of pressor action When compared equimolecularly with *nor*-ephedrine and *p*-hydroxy-*nor*-ephedrine, they were shown to be much less active It is thus clear that the replacement of H on the benzene ring at the *p*-position, or on the OH group at the *p*-position, by a simple alkyl group such as a methyl radical is unfavorable to the pressor action

3,4-Dihydroxy-*nor*-ephedrine (racemic) is the most powerful of the whole list In 10 pithed cats, the average pressor action was determined to be  $\frac{1}{4}$  that of epinephrine A 1 5000 solution of 3,4-dihydroxy-*nor*-ephedrine matched very closely with one of 1 20,000 of epinephrine in the majority of animals Unlike ephedrine, with this synthetic product there is no prolongation of action and no loss of effectiveness on repeated intravenous injections (see Fig 1)

The same ratio of activity between 3,4-dihydroxy-*nor*-ephedrine and epinephrine, that is, 1 4, was obtained by perfusion experiments in frogs for cardiac stimulation or vaso-constriction The minimal concentration of 3,4 dihydroxy *nor*-ephedrine that increased both the rate and the amplitude was 1 2,500,000, while that of epinephrine which produced the same effect was 1 10,000,000 Similarly, the minimal effective concentration of the former for vaso-constriction was 1 2,000,000 and that of the latter 1 8,000,000 It has been our impression that the vaso constricting action in frogs of 3,4-dihydroxy-*nor*-ephedrine is relatively less prompt than that of epinephrine

Tainter (8) and Hartung and co-workers (5) working with Hartung's product concluded that 3,4-dihydroxy-*nor*-ephedrine has  $\frac{1}{12}$  the activity of epinephrine, or indirectly, it is  $\frac{1}{3}$  as active as the German preparation which we studied It is possible that Hartung's compound had not attained its highest purity since he stated that he had failed to find a suitable solvent for recrystallization (5)

Compound No 4, 3,4-dihydroxy-ephedrine (racemic), is  $\frac{1}{10}$  as active as 3,4 dihydroxy-*nor*-ephedrine, or  $\frac{1}{40}$  as active as epinephrine, but is decisively more powerful than ephedrine in animals by intravenous injections In 10 pithed cats, a small volume (say 0 4 cc) of a 1 500 solution of 3,4-dihydroxy-ephedrine caused practically the same rise of blood pressure as that produced by an equal volume of a 1 5000 solution of 3,4-dihydroxy-*nor*-ephedrine, or a 1 20,000 solution of epinephrine Like the latter, 3,4-dihydroxy-ephedrine has a brief action, and repeated administration does not diminish the sensitivity of animals to it, as shown in Fig 1

Of the four tryptamines, the order of activity on the blood pressure was found to be as follows dimethyl-tryptamine < methyl-tryptamine < tryptamine < tri

methyl-tryptamine ammonium iodide Four cats were used in the determination The fact that tryptamine is stronger than methyl- and dimethyl-tryptamines, and 3,4-dihydroxy-*nor* ephedrine stronger than 3,4-dihydroxy-ephedrine, is in keeping with our previous observation (1) that primary amines are more powerful than secondary or tertiary amines The ammonium iodide of trimethyl-tryptamine has a marked pressor action An  $M/320$  solution matched very closely in two pithed cats a 1:20,000 solution of epinephrine—making the ratio of activity approximately 1:21 This increase of potency is to be expected for Barger and Dale (19) discovered some time ago that the quaternary ammonium salts are much more powerful than the corresponding less highly methylated amines They further observed that these substances have a nicotine-like effect The quantity of the present compound available was not sufficient to permit a thorough study, but *a priori* one would be tempted to assume that it would have the same type of action, that

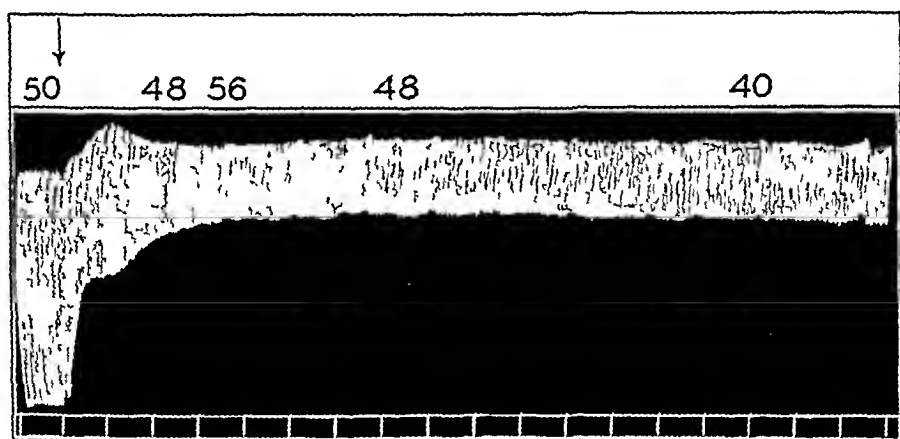


Fig 2—Action of trimethyl tryptamine ammonium iodide on frog's heart

Frog male, weighing 69 Gm, and pithed was perfused (at arrow) through the inferior vena cava with a 1:5000 solution of trimethyl tryptamine ammonium iodide The figures refer to ventricular rates per minute

is, a nicotine-like effect Both tryptamine and trimethyl-tryptamine ammonium iodide gradually lose a small fraction of their blood pressure raising property upon repeated intravenous injections (Fig 1)

Hypaphorine in the dosage of 5 mg did not raise the blood pressure, while cino-bufotenine in the form of a flavianate has  $1/10$  the pressor action of epinephrine (18) This appears to indicate that cino-bufotenine is more likely a derivative of tryptamine than of hypaphorine Furthermore, trimethyl-tryptamine ammonium iodide, like cino-bufotenine, has a tendency to increase the tone of the frog's heart when perfused through the inferior *vena cava*, as shown in Fig 2 There is also a gradual diminution of the action on the blood pressure with cino-bufotenine (see Fig 1)

#### B ACTION ON SMOOTH MUSCLE ORGANS

From Table I, it may be noted that, with the exception of *p*-methoxy-*nor*-ephedrine, other ephedrine derivatives all have a mydriatic action The results in

general agree with our former observation that an OH group on the C atom next to the benzene ring is essential for the dilatation of the pupil. The tryptamines and hypaphorine have practically no action on the pupil. Cino-bufotenine, however, constricts it (18).

On the isolated rabbit's intestine the majority of substances under investigation exert a stimulating action, most marked with trimethyl-tryptamine ammonium iodide and cino-bufotenine flavianate (Table I). Like epinephrine, both 3,4-dihydroxy- and 3,4-dihydroxy-*nor*-ephedrine inhibit intestinal movements. Hypaphorine is the only one of these amines that is devoid of any action.

All the compounds, except hypaphorine, contract the isolated virgin guinea pig's uterus. Epinephrine was tested on those strips of uterus with which 3,4-dihydroxy- and 3,4-dihydroxy-*nor*-ephedrine were studied, and was found to be oxytocic also. In other words, the similarity between the two dihydroxy ephedrine and epinephrine is qualitatively very great.

#### SUMMARY

A series of 10 amines, 4 of which are ephedrine derivatives and the remaining 6 contain an indole ring, have been studied pharmacologically.

If the blood pressure is taken as the criterion, an introduction of a methyl or methoxy radical at the *p*-position in the *nor*-ephedrine molecule results in a reduction of activity. The replacement of two OH groups for H at the 3,4-positions on the benzene ring greatly increases the intensity but abolishes the prolongation of the action. 3,4-Dihydroxy-*nor*-ephedrine has  $\frac{1}{4}$  and 3,4-dihydroxy-ephedrine  $\frac{1}{40}$  the activity of epinephrine (natural). Repeated intravenous injections of both compounds elicit the same responses as those produced by the first injection. They dilate the pupil and inhibit intestinal movements.

Tryptamine is more powerful than methyl- or dimethyl-tryptamines, but decisively less active than trimethyl-tryptamine ammonium iodide. The last one has  $\frac{1}{21}$  the activity of epinephrine, as far as the blood pressure is concerned.

*p*-Methyl- and *p*-methoxy-*nor*-ephedrine and all the tryptamines investigated stimulate isolated rabbits' intestines and guinea pigs' uterus. They have practically no action on rabbits' pupils, except *p*-methyl-*nor*-ephedrine which dilates them slightly.

Hypaphorine does not produce effects similar to those of the tryptamines.

Physiologically, cino-bufotenine, which has  $\frac{1}{10}$  the pressor action of epinephrine, is more like a derivative of tryptamine than of hypaphorine.

#### BIBLIOGRAPHY

- (1) K. K. Chen, C. K. Wu and E. Henriksen *J. Pharmacol. & Exper. Therap.* 36 (1923) 363
- (2) H. Jensen and K. K. Chen *Ber. deut. chem. Gesellsch.* 65 (1932) 1310
- (3) W. H. Hartung and J. C. Munch *J. Am. Chem. Soc.* 51 (1929) 2262
- (4) W. H. Hartung, J. C. Munch, W. A. Deckert and F. Crossley *Ibid.* 52 (1930) 3317
- (5) W. H. Hartung, J. C. Munch, E. Miller and F. Crossley *Ibid.* 53 (1931) 4149
- (6) O. Schaumann *Arch. exper. Path. Pharmacol.* 160 (1931) 127
- (7) Raymond-Hamet *Compt. rend. acad. sci.* 192 (1931) 300
- (8) M. L. Tainter, *Arch. intern. pharmacodyn. et ther.* 41 (1931) 365
- (9) A. J. Ewins and P. P. Laidlaw *Biochem. J.* 7 (1912) 18

- (10) M Guggenheim and W Löffler, *Biochem Z*, 72 (1916), 325  
(11) M Guggenheim *Die biogenen Amine* Julius Springer, Berlin, 2nd Edition, 1924, 335  
(12) R H F Manske *Can J Research*, 5 (1931), 592  
(13) M Greshoff, *Mededeelingen uit Lands Plantarium* 7 (1890) 29 (cited by Romburgh and Barger)  
(14) J Marañon and J K Santos *Philippine J Sci*, 48 (1932) 563  
(15) P v Romburgh and G Barger *J Chem Soc*, 99 (1911) 2068  
(16) R W Jackson *J Biol Chem* 84 (1929) 1  
(17) H Wieland G Hesse and H Mittasch *Ber deut chem Gesellsch* 64 (1931), 2099  
(18) K K Chen H Jensen and A L Chen *J Pharmacol & Exper Therap*, 43 (1931)  
13 (19) G Burger and H H Dale *J Physiol*, 41 (1910-1911) 19

---

### PHYTOCHEMICAL NOTES \*1

#### No 109 ON THE NON-PREEXISTENCE OF AZULENE IN MILFOIL

BY KATHERINE GRAHAM <sup>2</sup>

The preexistence of azulene in plants was first questioned by Tschirch and Hohenadel in 1895 (1), when they observed that sagapen yielded a yellow oil upon extraction with petroleum ether and that this oil became blue during fractionation. Not knowing whether the formation of the blue substance was due to the exposure of the volatile oil extracted with petroleum ether or to resin extracted at the same time, they prepared a resin-free volatile oil by steam distillation. This also was faintly yellow and only upon fractional distillation involving higher temperatures, viz, abt 200°, did they obtain a blue fraction. They, therefore, arrive at the conclusion that "without doubt, the blue oil is a pyrogenic decomposition product" (2). In 1917, however, Tschirch expresses himself as still in doubt as to whether the azulene is formed during the process of distillation (3).

Herzenberg and Ruhemann made a similar investigation in 1927 (4). They found that chamomile yielded only a small amount of a yellow oil to petroleum ether but that the extracted plant yielded a blue oil upon steam distillation. From this they concluded that azulene did not preexist in the plant and that its formation was from sesquiterpenes by fermentative action especially since they had isolated a sesquiterpene which yielded a blue color by dehydrogenation. However, the experiment performed does not support this conclusion. If the azulene were formed from sesquiterpenes, it would not then be obtained from the extracted marc, from which the sesquiterpenes had been removed. Furthermore, fermentative action would not be expected during steam distillation, where the temperature is much above the thermal death point of enzymes. Nor is dehydrogenation likely to take place during steam distillation.

The existence of azulene in the plant may more logically be explained by the assumption of an acid addition product since it is known that azulene readily forms such a product which is not soluble in petroleum ether. The union of azulene with either phosphoric acid or an acid phosphate would presumably give

---

\* From the laboratory of Edward Kremers

<sup>1</sup> Scientific Section A PH A, Miami meeting 1931

<sup>2</sup> Fritzsche Bros Fellow

a compound which could not be extracted with petroleum ether but which could be decomposed by the action of steam

Another hypothesis which may explain the presence of combined azulene, *z e*, in a form which cannot be extracted with petroleum ether, is that it may exist in glucosidal combination. We usually consider glucosides to be ether-like products of the union of a sugar and an alcohol. It is barely possible that a hypothetical colorless alcohol,  $C_{18}H_{19}OH$ , when set free and at the higher temperatures involved in fractionation, loses a molecule of water thus yielding the blue hydrocarbon. This hypothesis is based on a possible analogy with the formation of a terpene,  $C_{10}H_{16}$ , observed by Kayser (5) in 1884 when he obtained it upon the hydrolysis of the glucoside, picrocrocin. The presumption in this case is that a terpene alcohol results upon hydrolysis of the glucoside and that under the conditions of the experiment the alcohol breaks up into the terpene and water.

The experiment of Herzenberg and Ruhemann made with chamomile has been repeated upon a larger scale with milfoil. The results found are in accordance with those of the earlier investigators.

The material used was collected in June 1930, from the garden of the Wisconsin Pharmaceutical Experiment Station and from land southwest of Madison, under the direction of Professor W. O. Richtmann. Having been air dried, the inflorescences were carefully removed and ground in a Grumbach mill.

*I Extraction of the Flowers with Petroleum Ether and Subsequent Distillation*—4988 Gm of the ground milfoil flowers were extracted with petroleum ether in a Lloyd extractor. The flowers thus extracted were exposed so as to allow any adhering petroleum ether to evaporate. They were then transferred to a 60 liter Lentz copper still and subjected to steam distillation. The periods of distillation and the amount of aqueous distillate obtained in each are herewith tabulated.

Period—Day	Time—Hours	Amount—Gallons	Period—Day	Time—Hours	Amount—Gallons
1st	2	7	6th	0	0
2nd	3	10	7th	5	15
3rd	2	12	8th	1 <sup>1</sup> / <sub>2</sub>	5
4th	0	0	9th	4 <sup>1</sup> / <sub>2</sub>	20
5th	0	0	10th	1	5
			Totals	19	74

The distillation was discontinued when no more color could be extracted from the distillate with ether. The aqueous distillate which gave no acid reaction with litmus paper, was shaken with ether, and the ethereal solution separated. The solvent was recovered by distillation and there remained 4.8 cc (0.096 per cent) of a deep blue oil which had a density of 0.9516 at 25°. This oil was treated with phosphoric acid and the azulene phosphoric acid compound hydrolyzed with water. The liberated azulene was extracted with ether and after the removal of the solvent 0.5 cc of azulene remained (0.01 per cent).

The petroleum ether extract resulting from the percolation of the flowers was distilled under reduced pressure to remove the solvent. The residue thus obtained weighed 186 Gm. When steam distilled 12 cc (0.24 per cent) of a light blue oil separated from the aqueous distillate. It had a density of 0.9105 at 25°. The oil was fractionated under atmospheric pressure with the following results:

Temperature	Amount.
—170°	0.3 cc
170–180°	2.0 cc
180–190°	2.5 cc
190–200°	2.1 cc
200°+	4.2 cc

*II Extraction of the Azulene Compound with Chloroform* 1 *Hot*—100 Gm of the ground flowers were placed in a continuous extractor and exhausted with chloroform. The heat of the vapors was sufficient to keep the small percolator warm during the extraction. The solvent was removed from the extract by distillation under reduced pressure and the extract washed with solvents, resulting in the following products:

(A) A petroleum ether extract

(B) An ether extract and

(C) A residue

(A) The petroleum ether extract was steam distilled and the distillate washed with ether. The ethereal solution was colored blue.

(B) The ether extract was steam distilled and the distillate washed with ether. The ethereal solution was also colored blue.

(C) The residue was steam distilled and the distillate washed with ether, yielding no blue color.

(D) The extracted flowers were distilled with steam and the aqueous distillate yielded no blue color when washed with ether.

2 *Cold*—1000 Gm of the dried flowers were extracted by maceration with chloroform at room temperature. From the chloroformic extract the solvent was removed by distillation under reduced pressure. This extract was treated as in the previous experiment and resulted in similar products:

(A) The petroleum ether was removed by distillation under reduced pressure. The extract was steam distilled and yielded 3.4 cc (0.34 per cent) of a yellow oil.

(B) The ether extract was steam distilled after the removal of the ether. The distillate, when washed with ether, yielded a blue color.

(C) The residue was steam distilled and the distillate yielded a blue color.

(D) The extracted flowers, when steam distilled, yielded a faint blue color.

3 *Extraction by Percolation*—Two samples of 1000 Gm each of the ground flowers were packed in a percolator and extracted with chloroform. The chloroform was removed from the extract by distillation under reduced pressure. The extracts were treated as in the previous experiment:

(A) The petroleum ether was removed by distillation under reduced pressure. The extracts were steam distilled and 3 cc and 3.1 cc, respectively, of a yellow oil resulted.

(B) The ether was removed by distillation under reduced pressure and the extracts steam distilled. The distillate from both extracts yielded a blue color.

(C) The residues were steam distilled and both yielded a blue color.

(D) The extracted flowers were distilled with steam and no blue color was obtained.

4 *Preparation of the Chloroform Extract on a Larger Scale*—15,400 Gm of the ground flowers were packed in percolators and extracted with chloroform. The chloroform was removed by distillation under reduced pressure and 1520 Gm of extract resulted. The extract was washed with petroleum ether, resulting in two products:

(A) 377 Gm of a petroleum ether extract, and

(B) 790 Gm of residue.

*III The Azulene Compound*—The 790 Gm of chloroform extract deprived of its petroleum ether soluble constituents and containing the azulene compound were used in the following experiments:

(1) *Determination of the Inorganic Constituents*

(a) 0.8277 Gm of the extract yielded no ash.

(b) 1.6176 Gm of the extract yielded 0.0001 Gm ash.

These results indicate the improbability of an acid salt addition product since azulene is not known to add to any organic acid except formic, with which it forms a liquid and easily hydrolyzed compound.

(2) *Acid Hydrolysis*—If azulene is contained in the molecule in glucosidal combination, hydrolysis with acid should liberate it from the accompanying sugar molecule, which could be detected. The extract reduced Fehling's solution before hydrolysis. After hydrolyzing with dilute hydrochloric acid the amount of copper oxide was increased but constant values could not be obtained.

The extract was hydrolyzed for ten hours with 5 per cent sulphuric acid. After the reaction mixture was filtered it was divided and made neutral with sodium hydroxide. One half of the neutralized solution was extracted with ethyl acetate. Both portions were then treated with Fehling's solution. The untreated portion did reduce Fehling's solution. The portion washed with ethyl acetate did not reduce the copper solution.

(3) *Ester Value*—The ester value of the extract was determined in order to obtain an indication of the possibility of alkaline hydrolysis.

(a) 0.4204 Gm of the extract required 0.379 cc of normal potassium hydroxide for neutralization, corresponding to an acid value of 36. When heated for one half hour, the sample reacted with 1.94 cc of normal potassium hydroxide, corresponding to a saponification value of 184. Ester value = 148.

(b) 0.4046 Gm of the extract required 0.4 cc of normal potassium hydroxide for neutralization corresponding to an acid value of 39. When heated it reacted with 1.94 cc of normal potassium hydroxide corresponding to a saponification value of 191. Ester value = 152.

(4) *Alkaline Hydrolysis*—The extract was treated for an hour with sodium hydroxide solution without heat. The mixture was filtered on a force filter and the residue (a) washed with water. The filtrate was made acid with dilute hydrochloric acid, added slowly and with continuous stirring. The resulting precipitate was separated on a force filter and washed with water. (b) The filtrate was distilled to dryness and the residue extracted with alcohol, which was removed by distillation. (c) The results of the hydrolysis are shown in the accompanying table.

Reagent NaOH	Extract	Insoluble Substance (a)	Soluble substance (b)	Residue (c)
5 p c	4 Gm	0.05 Gm	0.7 Gm	
5 p c	10 Gm	0.3 Gm	4.5 Gm	3.0 Gm
5 p c	10 Gm	0.1 Gm	2.0 Gm	7.2 Gm
5 p c	10 Gm	0.1 Gm	4.3 Gm	3.5 Gm
2 p c	10 Gm	2.7 Gm	1.2 Gm	5.0 Gm
2 p c	10 Gm	2.7 Gm	1.9 Gm	4.5 Gm
2 p c	10 Gm	3.7 Gm	1.0 Gm	4.5 Gm

The acid precipitated substances of the first four experiments were bulked and neutralized with sodium hydroxide. This sodium salt was used to prepare the barium and silver salts. 5 Gm of the sodium salt yielded 2 Gm of the barium salt, which was analyzed for barium content.

(a) 0.9198 Gm of the barium salt yielded 0.0968 Gm of barium carbonate corresponding to 7.32 per cent of barium.

(b) 1.0230 Gm of the barium salt gave 0.1070 Gm of barium carbonate corresponding to 7.38 per cent of barium.

5 Gm of the sodium salt were treated with silver nitrate and yielded 5.5 Gm of silver salt which upon analysis yielded the following results.

(a) 0.9760 Gm of the silver salt gave 0.2395 Gm of silver corresponding to 24.5 per cent of silver.

(b) 1.0945 Gm of silver salt gave 0.2690 Gm of silver corresponding to 24.57 per cent of silver.

Attempts to form oximes or acetyl derivatives with other products of the hydrolysis yielded no results.

(5) *Carbonyl Oxygen*—(a) Reaction with phenyl hydrazine. 0.5 Gm of the extract was dissolved in alcohol. 2 cc of acetic acid and 5 cc of phenyl hydrazine were added. The mixture was warmed for 10 minutes. Upon cooling small crystals of phenylhydrazine acetate, m p 127° settled out and were filtered off. The mother liquor yielded an amorphous product with no characteristic melting point.

(b) Reaction with hydroxylamine. 2 Gm of the extract were dissolved in alcohol and treated with 2 Gm of hydroxylamine hydrochloride and sodium carbonate. Upon standing a grayish green amorphous precipitate formed. This precipitate was filtered off and treated with hydrochloric acid. The resulting solution gave no reduction of Fehling's solution.

(6) *Hydroxyl Groups*—(a) Acetylation. 5 Gm of the extract were heated with acetic acid anhydride and sodium acetate for one hour. The product was washed with sodium car



bonate solution, then with water and dried. The saponification value of this product could not be determined because of the color.

(b) *Benzoylation* 13.5 Gm of the extract were dissolved in 50 cc of pyridine and cooled well. 15 cc of benzoyl chloride were added in small portions, shaking after each addition. White crystals separated which were filtered off on a force filter and washed with pyridine. The platinum double salt of these crystals melted at 240° (indicating pyridine hydrochloride). The filtrate was diluted with ether. 2.2 Gm of an insoluble residue remained which when treated with sodium hydroxide gave an odor of pyridine. The ethereal solution was washed with dilute hydrochloric acid, with sodium carbonate solution and with water and the ether removed by distillation under reduced pressure. 14 Gm of the ester were obtained.

(a) 1.0860 Gm of the ester reacted with 4.88 cc of normal sodium hydroxide corresponding to a saponification value of 178.

(b) 0.9885 Gm of the ester reacted with 4.39 cc of normal sodium hydroxide, corresponding to a saponification value of 179.

7 *Oxidation with Nitric Acid*—Since the action of nitric acid upon azulene is not known it would render the situation less complicated if the azulene could be removed from the molecule before oxidation. Steam distillation of the extract yielded the azulene very slowly, some blue color being obtained after 70 hours of distillation. Therefore other means for the removal of the azulene were sought.

5 Gm of the extract were mixed with 300 cc of water and placed in a heavy walled, tightly stoppered bottle and heated on an oil bath at 150° for eight hours. The contents of the bottle were then steam distilled. The first distillate yielded a deep blue color and as distillation continued less and less of the color was obtained. However, after 60 hours of distillation some blue color was still obtained.

Acid hydrolysis, using 15 per cent hydrochloric acid in amyl alcohol solution (6) yielded no azulene when the contents of the flask were steam distilled. The same reaction was tried under pressure with no different results. Therefore the attempts to remove azulene from the molecule were abandoned.

Oxidation of the extract was conducted in the following manner. 5 Gm of the extract were mixed with 20 cc of nitric acid added slowly while the mixture was kept well cooled. The mixture was then allowed to warm slightly almost to room temperature. As soon as brown fumes were evolved the mixture was cooled in an ice bath so that the reaction proceeded slowly. When no more brown fumes were evolved from the mixture at room temperature, the reaction was regarded as complete. An insoluble substance rose to the surface of the liquid and was separated and washed with water. The reaction mixture was diluted with water and a flocculent precipitate resulted which was filtered off and washed with water. The bright yellow aqueous liquids were united and saved for further investigation.

The results of four such experiments are given in the following table.

Extract	Insoluble Substance	Soluble Substance	Total
5 Gm		1.19 Gm	
5 Gm	3.89 Gm	0.45 Gm	4.34 Gm
5 Gm	1.6 Gm	1.6 Gm	3.2 Gm
5 Gm	1.6 Gm	1.22 Gm	2.82 Gm

The products were combined and washed with boiling alcohol. This procedure yielded 1.4 Gm of a substance insoluble in alcohol, 1.2 Gm of a substance which precipitated from the hot alcohol and 6 Gm of an amorphous residue left upon evaporation of the mother liquor. This residue was acid to litmus, soluble in sodium hydroxide solution from which it was precipitated by acid. From the sodium salt a barium and a silver salt were prepared.

(1) 0.3330 Gm of the barium salt yielded 0.0190 Gm of barium carbonate corresponding to 4.1 per cent of barium.

(2) 0.7100 Gm of the barium salt yielded 0.5000 Gm of barium carbonate corresponding to 4.7 per cent of barium.

(3) 0.8080 Gm of the silver salt yielded 0.1762 Gm of silver corresponding to 21.8 per cent of silver.

(4) 0.7000 Gm of the silver salt yielded 0.1470 Gm of silver, corresponding to 20.0 per cent of silver.

The aqueous liquids from the oxidation mixture were distilled and resulted in a clear, acid distillate and a yellow, acid residue from which nothing solid separated. The distillates were combined and neutralized with barium carbonate. The mixture was filtered and the residues tested for organic matter. None was found present. The aqueous portion was concentrated and the crystals obtained did not char. This excludes the possibility of volatile acids resulting from the oxidation.

The residues were combined and neutralized with barium carbonate. The excess barium carbonate was filtered off and gave no test for organic matter. The aqueous portion when evaporated to dryness was found to contain organic material. A positive test for picric acid could not be obtained.

#### SUMMARY

It has been shown that azulene does not preexist in the flowers of milfoil but is formed during the process of distillation in the preparation of the volatile oil.

The azulene-yielding compound is contained in the chloroformic extract from which the petroleum ether-soluble constituents (bulk of the so-called volatile oil but minus the blue azulene) have been removed.

The nature of this compound has not yet been determined.

#### BIBLIOGRAPHY

- (1) *Arch. Pharm.*, 233 (1895) 259
- (2) *Ibid.* 279
- (3) Tschirch, *Handbuch d. Pharmakognosie* Vol II page 964
- (4) *Ber.*, 60 (1927) 2464
- (5) *Ibid.*, 17 (1884) 2228
- (6) Power and Salway *J. Chem. Soc.* 103 (1913) 399

---

### WASHINGTON BELLADONNA AND METHODS OF ASSAY \*

BY CLAIRE EVANS AND F. J. GOODRICH

The somewhat unstable character of the active principles found in belladonna plants is well known and, in fact, the chemistry and structure of the important components have been thoroughly studied. The assay of the roots, as well as the leaves, of many belladonna plants for mydriatic alkaloids has been made, resulting in great variations with different samples. Some quantitative methods have been tried experimentally on prepared samples of the drug and many explanations offered as to the varying amounts of the alkaloids. Undoubtedly, numerous factors are responsible for the large differences in alkaloidal content of both roots and leaves.

It has been deemed of interest to investigate the alkaloidal content of belladonna roots collected over a period of years, using different, selected methods for making the determinations. Roots grown on the University of Washington campus were chosen because no assays, so far as could be learned, had been made on belladonna of western Washington. The purpose of the present study has been, therefore, to select a satisfactory method of assay and to determine the quantity of alkaloids from roots grown in the Pacific Northwest, collected in successive years and aged for varying periods.

---

\* Scientific Section A. P. H. A. Toronto meeting 1932

Many methods of analysis and modifications of these methods were tried. Those reviewed were the ones outlined by the United States Pharmacopœia since 1900, as well as the methods used by Mayer (1), Lyons (2), Gunther (3), Lefort (4), Thresh (5), Gerrard (6), Dunstan and Ransom (7), Kippenberger (8), Falieres (9), Beekurts (10), Thoms (11) and Rasmussen (12). Several of the methods were not deemed practical for the work, or did not give consistent results, and were not used in the examination of a selected number of samples of belladonna roots.

#### COMPARISON OF ASSAY METHODS

In looking for a suitable method with which to assay the roots for alkaloids, many methods were reviewed and four of them were finally adopted: (a) the method of the U S P X, (b) a modification of the latter, (c) a method by Lyons and (d) a method by Dunstan and Ransom.

After using the method of assay of the U S P X on several samples and finding the results to agree only fairly well, a slight modification was tried. In place of a percolator, a separatory funnel was used to exhaust the drug. Since it seemed that the tenth-normal acid would cause too great an error in case the exact end-point was not obtained, the alkaloids were finally titrated with twentieth-normal sulphuric acid. The excess was then treated with fiftieth-normal sodium hydroxide, using methyl red as indicator, since the end-point given with it was more readily recognized than that given with cochineal.

Lyons suggested macerating about 10 Gm. of the drug with a mixture consisting of 1 cc. of stronger ammonia water, 4 cc. of alcohol and 5 cc. of chloroform-ether (1:6 by volume). The drug and solvent were thoroughly mixed, packed in a percolator and allowed to macerate for five or ten minutes before percolating with the appropriate solvent. From here the assay was carried on by shaking out with acid, then with chloroform and finally by titrating the alkaloids with twentieth-normal sulphuric acid.

According to the Dunstan and Ransom method about 20 Gm. of the dry, powdered root were exhausted by hot percolation with absolute alcohol. It was found that 60 to 80 cc. of the solvent were required. The percolate was diluted with water, acidified with HCl and repeatedly extracted with chloroform in order to remove fats and pigmented materials. The aqueous liquid was rendered alkaline with ammonia and the alkaloids removed with chloroform, which in turn was evaporated slowly on a water-bath. According to the original method, the alkaloids were determined gravimetrically at this stage.

In using the Dunstan and Ransom method, as specified above, it was found that the alkaloidal residue was never white. It would, therefore, be safe to conclude that there were still some impurities present which would give inaccurate results if the total weight of the residue from the final chloroformic extraction were calculated as alkaloids.

When the alkaloidal residue from the above was titrated with twentieth-normal sulphuric acid, and the excess of the latter titrated with fiftieth-normal sodium hydroxide solution, using methyl red as indicator, much lower results were obtained than by the gravimetric method. A comparison of the percentages obtained by using both the gravimetric and the volumetric methods, to determine the amount of alkaloids after extracting them by Dunstan and Ransom's method,

showed that samples which gave by the volumetric method 0.07, 0.14, 0.07 and 0.065 per cent of alkaloids, gave gravimetrically 0.27, 0.36, 0.27 and 0.14 per cent, respectively. The fact that the results from the gravimetric work were higher would tend to prove the presence of impurities in the residues. In this experimental work, it was therefore decided to titrate the alkaloidal residue.

TABLE I —COMPARISON OF RESULTS—AIR DRIED BELLADONNA ROOTS

Sample	U S P X	Per Cent of Alkaloids	Lyons	Dunstan Ransom
		Modified U S P X		
1	0.26	0.12	0.38	0.18
	0.30	0.15	0.26	0.32
	0.38	0.32	0.25	0.33
2	0.21	0.136	0.156	0.137
	0.23	0.16	0.190	0.137
3	0.16	0.138	0.096	0.14
	0.19	0.268	0.116	0.17
		0.133	0.028	
4	0.28	0.099	0.053	0.30
	0.29	0.023	0.155	0.30
		0.128	0.104	
		0.190	0.060	
5	0.18	0.134	0.189	0.13
	0.11	0.167	0.145	0.14
6	0.08	0.128	0.033	0.07
	0.10	0.110	0.109	0.07
				0.067
				0.139

From the accompanying table, reading from top to bottom in the column of results obtained by the U S P X process, it is evident that the results yielded by that method are but fairly constant for each sample assayed. The official procedure also has the disadvantage of requiring much time and repeated testing before exhaustion of the drug is attained.

The figures obtained for the various samples by the modification of the U S P X method show but little in favor of altering the official process in this way.

In the method suggested by Lyons, the solvent (chloroform and ether 1 to 6) proved of no special advantage. The various results obtained by this process, as shown by Table I, differed greatly for the same samples.

The data obtained by using the method suggested by Dunstan and Ransom, followed by titration, gave results which were the most consistent throughout the series of assays. Another point in favor of this method is that the actual attention required to exhaust the drug was less than with other methods, and the technique necessary in transferring the weighed sample of the drug to the Soxhlet was unimportant, whereas with the other assays there was always loss of time and much inconvenience at this stage of the work.

Reading across the table from left to right shows that the percentages obtained for the same sample, by various methods of assay are very discordant,

and the conclusion arises that there is still much room for improvement in the assays used

Possible reasons for the lack of agreement between the above four methods, as indicated by the results in the first table, might be the absence of total exhaustion, caused by channeling, and insufficient maceration in the case of the total exhaustion processes. The possibility of hydrolysis might explain the lack of checks and the greater or lesser amount of hydrolysis accounts for variation by different methods. Since the final chloroformic solvent was evaporated on a water-bath, some of the volatile alkaloidal principles, claimed by some to be present, might have been dissipated. However, this last explanation could hardly be true, since the evaporation was the same by all methods and they did not all yield unusually low results.

*Washington Roots after Storing*—Analyses were made of samples of belladonna roots which were harvested in the following years: 1922, 1923, 1924, 1925, 1926, 1927, from the University of Washington drug garden. No record was made as to exact dates of collections or age of the perennial roots. The collections were presumably made from plants grown prior to 1922, thus making an increase of one year in the growing age of each consecutive sample. These roots were all dried and stored until 1928, when they were assayed. The results were based on Dunstan and Ransom's method with addition of titration. The air-dried drug was used for analysis and the per cent of alkaloid then calculated on the basis of drug dried at 100 degrees C.

TABLE II—ROOTS AFTER STORING—DRIED AT 100 DEGREES C

Year of Collection	Average Per Cent of Alkaloids
1922	0.348
1923	0.166
1924	0.154
1925	0.318
1926	0.166
1927	0.104

As shown by Table II there was evidently no correlation between the length of time stored and the percentage of alkaloids, since the roots gathered in 1922 contained the largest quantity, while the 1927 roots contained the least. The variability between samples of different years might be accounted for by a possible difference in the total age of the root, i. e., period of growth and time stored taken together. Another significant factor is that they were not collected at exactly the same time of the year.

#### SUMMARY

Of the four methods used in this work, the assay by Dunstan and Ransom (with titration) seemed preferable.

In making a comparative analysis of the roots collected in successive years and stored over a period of time, it was found that there was no correlation between length of time stored and alkaloidal content.

The great variability between the samples of different years may be due

to the natural variation of different crops, to the total age of the roots, or to a possible difference in the time of year when they were collected

## BIBLIOGRAPHY

- (1) F F Mayer, *Am J Pharm*, 35 (1863), 20
- (2) A B Lyons *Proc A Ph A*, 35 (1887), 303-308
- (3) N Gunther, *J de Chem Med*, 65 (1870), 201, through *Proc A Ph A*, 19 (1871) 289
- (4) J Lefort *J pharm chim*, 4th series, 15 (1876), 365, through "Y B Pharm and Trans" (1872), 233
- (5) J C Thresh *Pharm J and Trans* (Apr 10, 1880), 809-814, through *Proc A Ph A*, 28 (1880) 319
- (6) A W Gerrard "Y B Pharm and Trans" (1881), 480
- (7) Dunstan and Ransom, "Y B Pharm and Trans" (1885), 391-393
- (8) Karl Kippenberger, *Z anal Chem*, 35 (1896), 422-471, through *J Lou Chem Soc A II*, 682 (1896)
- (9) E Faberes *Compt rend*, 129 (1900), 110, through "Y B Pharm and Trans" (1900) 101
- (10) H Beckurts *Pharm Post* 18 (1885), 67, through *Pharm J* (4), 16 (1885), 267, 425 from "Y B Pharm and Trans" (1903), 183
- (11) H Thoms *Berichte Pharm*, 15 (1884), 85, through "Y B Pharm and Trans" (1905), 18
- (12) H B Rasmussen *Arch Pharm Chem*, 24 (1917), 83-86, 110-113, through *C A*, 11 (1917), 2261

COLLEGE OF PHARMACY  
UNIVERSITY OF WASHINGTON  
SEATTLE, WASHINGTON

## A PHYTOCHEMICAL INVESTIGATION OF THE OLEORESIN OF PINUS MONTICOLA DOUGL \*

BY P A FOOTE<sup>1</sup> AND N T MIROV<sup>2</sup>

Western White Pine (*Pinus monticola* Dougl) is a five-needle pine growing on the "middle and upper slopes of northwestern mountains from the west side of the continental divide in northern Montana and British Columbia to Washington, Oregon and California" (1) It is a large source of timber in the West The oleoresin herewith reported on came from trees growing in an environment far from their optimum, so much so that they offer more than ordinary phytochemical interest Especially will this be true when the oleoresin from other localities has been analyzed Unlike most spirits of turpentine, which usually consist of terpenes, sesquiterpenes and their oxygenated products, this oil contains about one per cent of a paraffin hydrocarbon, *n*-undecane,  $C_{11}H_{24}$  This gives our investigation added interest since this paraffin has been identified only once before in the plant kingdom This was found by Simonsen and Rau (2) in 1922 in the oleoresin of *Pinus excelsa* growing in India In 1913 Schorger (3) isolated a paraffin hydrocarbon from *Pinus lambertiana* This had physical properties close to

\* Scientific Section A Ph A, Toronto meeting, 1932

<sup>1</sup> Prof of Pharmacy University of Florida  
Formerly with the U S Forest Service

*n*-undecane but he lacked a sufficient quantity to identify it. Inasmuch as both *Pinus excelsa* and *Pinus lambertiana* are also five-needle pines and thus closely related to *Pinus monitcola* it is more than probable that Schorger's paraffin hydrocarbon was *n*-undecane.

So far as we are aware there have been but two other normal paraffin hydrocarbons identified in the volatile oils, *viz.*, *n*-heptane and *n*-pentadecane. The former occurs in the Jeffrey (*Pinus Jeffreyi*) and Digger (*Pinus sabimiana*) pines of the West and in Petroleum Nuts of the Philippines.

The pentadecane occurs in oil of *Kämpferia galanga*, a plant of the Zingiberaceæ used as a condiment in India and the Malay Peninsula.

Why has the tree produced this undecane instead of a terpene or a sesquiterpene? We raise the question as food for thought without being able to answer it. Simonsen and Rau point out that *P. lambertiana* and *P. excelsa* are the only members of the "strobilus" (five-leaved) group from which the oil of the oleoresin has been analyzed and that each contains a paraffin hydrocarbon. They speculate that perhaps all members of this group produce paraffins in their oleoresins. Our investigation strengthens this view for Western White Pine belongs in this group. Accepting the theory of the organic origin of petroleum, they also ask the question if the pines have been the source of petroleum, at least in certain areas. These hydrocarbons occur in American petroleum and the Coniferæ have been found in the lower strata.

Have environmental conditions caused the tree to produce an unusual constituent? In the past many investigators have cared little about the environment the plant grew in. They were content to report the botanical classification and their analysis. Hence it is possible for two separate workers to contradict each other and yet each be right. Let us illustrate. It is a well-known fact among large turpentine operators of the Southeast that the same species of *Pinus* will produce different chemical constituents in its oleoresin if produced in different regions. In the West we may cite Western Yellow Pine (*Pinus ponderosa*). Typical Pacific Coast Western Yellow Pine yields a lævo-rotatory oil and consists largely of beta-pinene while the Rocky Mountain form (variety *scopulorum*) has a dextro-rotatory oil and its chief constituent is alpha-pinene. Even on the Pacific Coast the junior author has found that the chemical composition of Western Yellow Pine oleoresin is far from uniform. In view of these facts we consider it essential to report not only the conditions under which these trees are growing but also the time and method of collection of the gum.

#### THE ENVIRONMENT

The experimental trees are located in the northern part of the Warner Mountains, which is one of the Great Basin Ranges. Warner Mountain ridge is located chiefly in Modoc County, California. R. J. Russell (4) says of this range, 'At the North the mountainous unity is very gradually lost in mergeance with a high plateau between Albert Lake and Warner Valley. A similar transition at the southern end of the range unites it with the high plateaus just east of Madeline Plains. Goose Lake Valley is located just west of the range with an extensive body of water in its central part. The easterly slope of the range faces the Surprise Valley. The east of this valley raises Hays Canyon Range from the summit of which a broad plateau extends eastward to the Black Rock Desert. The width of the range in its typical portion varies from about eight to twenty miles. Toward the plateaus the range widens rapidly.' The trees that were tapped lie strictly in the Great Basin (5).

to the natural variation of different crops, to the total age of the roots, or to a possible difference in the time of year when they were collected

## BIBLIOGRAPHY

- (1) F F Mayer *Am J Pharm*, 35 (1863), 20
- (2) A B Lyons, *Proc A Ph A* 35 (1887), 303-308
- (3) N Gunther, *J de Chem Med*, 65 (1870) 201, through *Proc A Ph A*, 19 (1871), 289
- (4) J Lefort, *J pharm chim*, 4th series, 15 (1876), 365, through "Y B Pharm and Trans" (1872), 233
- (5) J C Thresh *Pharm J and Trans* (Apr 10, 1880), 809-814, through *Proc A Ph A* 28 (1880) 319
- (6) A W Gerrard, "Y B Pharm and Trans" (1881), 480
- (7) Dunstan and Ransom "Y B Pharm and Trans" (1885), 391-393
- (8) Karl Kippenberger, *Z anal Chem*, 35 (1896), 422-471, through *J Lon Chem Soc*, A II, 682 (1896)
- (9) E Fahres *Compt rend*, 129 (1900), 110, through "Y B Pharm and Trans" (1900) 101
- (10) H Beckurts, *Pharm Post*, 18 (1885), 67, through *Pharm J* (4), 16 (1885), 267, 425, from "Y B Pharm and Trans" (1903), 183
- (11) H Thoms *Berichte Pharm*, 15 (1884), 85, through "Y B Pharm and Trans" (1905), 18
- (12) H B Rasmussen *Arch Pharm Chem*, 24 (1917), 83-86, 110-113, through *C A*, 11 (1917) 2261

COLLEGE OF PHARMACY  
UNIVERSITY OF WASHINGTON  
SEATTLE, WASHINGTON

## A PHYTOCHEMICAL INVESTIGATION OF THE OLEORESIN OF PINUS MONTICOLA DOUGL \*

BY P A FOOTE<sup>1</sup> AND N T MIROV<sup>2</sup>

Western White Pine (*Pinus monticola* Dougl) is a five-needle pine growing on the "middle and upper slopes of northwestern mountains from the west side of the continental divide in northern Montana and British Columbia to Washington, Oregon and California" (1) It is a large source of timber in the West The oleoresin herewith reported on came from trees growing in an environment far from their optimum, so much so that they offer more than ordinary phytochemical interest Especially will this be true when the oleoresin from other localities has been analyzed Unlike most spirits of turpentine, which usually consist of terpenes, sesquiterpenes and their oxygenated products, this oil contains about one per cent of a paraffin hydrocarbon, *n*-undecane,  $C_{11}H_{24}$  This gives our investigation added interest since this paraffin has been identified only once before in the plant kingdom This was found by Simonsen and Rau (2) in 1922 in the oleoresin of *Pinus excelsa* growing in India In 1913 Schorger (3) isolated a paraffin hydrocarbon from *Pinus lambertiana* This had physical properties close to

\* Scientific Section A Ph A, Toronto meeting 1932

<sup>1</sup> Prof of Pharmacy, University of Florida

<sup>2</sup> Formerly with the U S Forest Service



*n*-undecane but he lacked a sufficient quantity to identify it. Inasmuch as both *Pinus excelsa* and *Pinus lambertiana* are also five-needle pines and thus closely related to *Pinus monticola* it is more than probable that Schorger's paraffin hydrocarbon was *n*-undecane.

So far as we are aware there have been but two other normal paraffin hydrocarbons identified in the volatile oils, *viz.*, *n*-heptane and *n*-pentadecane. The former occurs in the Jeffrey (*Pinus Jeffreyi*) and Digger (*Pinus sabiniana*) pines of the West and in Petroleum Nuts of the Philippines.

The pentadecane occurs in oil of *Kampferia galanga*, a plant of the Zingiberaceæ used as a condiment in India and the Malay Peninsula.

Why has the tree produced this undecane instead of a terpene or a sesquiterpene? We raise the question as food for thought without being able to answer it. Simonsen and Rau point out that *P. lambertiana* and *P. excelsa* are the only members of the "strobilus" (five-leaved) group from which the oil of the oleoresin has been analyzed and that each contains a paraffin hydrocarbon. They speculate that perhaps all members of this group produce paraffins in their oleoresins. Our investigation strengthens this view for Western White Pine belongs in this group. Accepting the theory of the organic origin of petroleum, they also ask the question if the pines have been the source of petroleum, at least in certain areas. These hydrocarbons occur in American petroleum and the Coniferæ have been found in the lower strata.

Have environmental conditions caused the tree to produce an unusual constituent? In the past many investigators have cared little about the environment the plant grew in. They were content to report the botanical classification and their analysis. Hence it is possible for two separate workers to contradict each other and yet each be right. Let us illustrate. It is a well-known fact among large turpentine operators of the Southeast that the same species of *Pinus* will produce different chemical constituents in its oleoresin if produced in different regions. In the West we may cite Western Yellow Pine (*Pinus ponderosa*). Typical Pacific Coast Western Yellow Pine yields a lævo-rotatory oil and consists largely of beta-pinene while the Rocky Mountain form (variety *scopulorum*) has a dextro-rotatory oil and its chief constituent is alpha-pinene. Even on the Pacific Coast the junior author has found that the chemical composition of Western Yellow Pine oleoresin is far from uniform. In view of these facts we consider it essential to report not only the conditions under which these trees are growing but also the time and method of collection of the gum.

#### THE ENVIRONMENT

The experimental trees are located in the northern part of the Warner Mountains which is one of the Great Basin Ranges. Warner Mountain ridge is located chiefly in Modoc County, California. R. J. Russell (4) says of this range, "At the North the mountainous unity is very gradually lost in mergence with a high plateau between Albert Lake and Warner Valley. A similar transition at the southern end of the range unites it with the high plateaus just east of Madeline Plains. Goose Lake Valley is located just west of the range with an extensive body of water in its central part. The easterly slope of the range faces the Surprise Valley. The east of this valley raises Hays Canyon Range from the summit of which a broad plateau extends eastward to the Black Rock Desert. The width of the range in its typical portion varies from about eight to twenty miles. Toward the plateaus the range widens rapidly." The trees that were tapped lie strictly in the Great Basin (5).

Russell defines the Great Basin as an area drained by streams which fail to reach the ocean

The Warner Mountain forests are separated from the other forests of California and Oregon by extensive sage brush plateaus. The wide alkaline Goose Lake Valley separates the Warner Range from other forests of the northern part of California, while a desert extends east of the range. Western White Pine in the Warner Mountains is thus growing isolated by treeless areas from other localities where this species grows.

In order to show the location in Warner Mountains of the Western White Pine stands where experimental tapping was done, and to show the relation of these stands to other vegetation of this region, it appears to be desirable to trace the changes in vegetation from Buck Creek Ranger Station located on the westerly slope of the ridge toward Fort Bidwell in the Surprise Valley. In the vicinity of Buck Creek Station the slope is covered by a Western Yellow Pine forest, with occasional jumpers (*Juniperus occidentalis* Hooker). In the open places occur wild plum (*Prunus subcordata* Benth.) in mixture with Mountain Mahogany (*Cercocarpus ledifolius* Nutt.). The elevation of this place is 5400'. On the higher slopes of Buck Creek Canyon Incense Cedar (*Libocedrus decurrens* Torrey) is added to Western Yellow Pine, while at 6000' White Fir (*Abies concolor* Parry) appears. Flat places occasionally found at this elevation are swampy and occupied by aspen (*Populus tremuloides* Michx.) groves and a ground cover in which *Veratrum* is conspicuous. At 6200' pure White Fir occupies the ground although Old Western Yellow Pines go as high as 6750' in open places, otherwise covered with Choke Cherry (*Prunus demissa* Wal.) and Service Berry (*Amelanchier alnifolia* Nutt.). At 7200' among the White Firs, some Western White Pines appear. The top of the ridge lies at 7400'. An extensive flat here reaches eastward and is covered with a park like forest composed of Western White Pine, Lodgepole Pine (*Pinus contorta* Loud.) and occasional White Firs. Dense stands of pure Lodgepole Pine occupy a swampy depression of the flat and extend up the north slope of Fandango Peak, which rises south of the experimental area. Rocky summits are covered with scrubby Mountain Mahogany. The drier and more elevated portions of the flat are covered with sage brush (*Artemisia tridentata* Nutt.) which occupies also the southern slope where scrubby Aspens occur in places.

The experimental trees were located in this park like forest at an elevation of 7400'. This area is exposed to severe winds and the trees growing on the edge of the flat show irregular wind bitten crowns. When the first trip was made to the top of the ridge on June 8, 1929, the whole plateau was covered with deep snow. On June 16th-18th a severe snow storm took place and interfered with the tapping operation. In shady places snow banks 6' deep were found as late as July 4th. The growing season is very short in this locality and the month of June is a spring month here. Few species of annual plants were flowering during this month but willows (*Salix* sp.) by the stream were blooming. In July *Wyethia mollis* begins to flower and this is the only herbaceous species occupying the ground till the end of the season.

#### OLEORESIN EXTRACTION

At the beginning of June, 30 cups were set on the trees, 26 on 13 mature trees and one each on four young specimens. Oblong galvanized cups, and aprons attached with nails instead of the conventional ax insertion, were used in this experiment and scarification was performed with a No. 0 round hack. Oleoresin as it accumulated in the cups was put into friction top tin cans. The trees were tapped first on June 8th. The first sample of oleoresin was collected June 22nd. The last chipping was done July 27th and the last batch of gum was collected August 4th.

Date.	Oleo Yield Gm	Cumulative Gm	Yield per Cup per Streak Oz	Notes
June 22	403	403	0.90	30 cups
June 30	1528	1931	1.80	
July 7	1048	2979	1.20	
July 10	1092	4071	1.35	27 cups
July 13	812	4883	0.97	30 cups
July 20	1208	6091	1.53	
July 27	1441	7532	1.82	
Aug 4	2267	9799	2.67	28 cups

The foregoing table gives the oleoresin yield throughout the tapping season

The average yield of 1.53 oz per cup per streak obtained from Western White Pine in this locality is very small compared with that of other turpentine producing pines. A slight increase in yield may be noticed toward the end of the tapping season, but even the highest amount of oleoresin obtained at the last chipping at the beginning of August, is much smaller than the average yield obtained from Western Yellow Pine in the same region.

It remains to be seen whether a low oleoresin yield is specific to Western White Pine in general, or whether it is due to the fact that this species in the Warner Mountains is growing under unfavorable conditions, being far from its environmental optimum.

#### OLEORESIN EXAMINATION

Oleoresin obtained from Western White Pine has a honey-like consistence and stringy appearance. It possesses a pungent odor not similar to that of common turpentine. It does not crystallize as readily as Western Yellow Pine oleoresin, but on standing retains its stringy, viscous and homogeneous character. It resembles the oleoresin of Sugar Pine (*Pinus lambertiana*).

Four samples of the oleoresin were subjected to steam distillation for volatile oil separation as soon as they were obtained from the trees. The operation was done in a 1000 cc round-bottom flask with a Kjeldahl connecting bulb tube placed between the flask and condenser to prevent any rosin from being carried over. After all the oil was removed the remaining rosin was heated in a paraffin bath until all water had been removed. The temperature was not allowed to rise above 145° C. The oleoresin foamed excessively on distillation with steam and the last traces of oil were removed with difficulty. Yield of oil and rosin was as follows:

Sample of Oleoresin	Per Cent Oil	Per Cent Rosin	Per Cent Impurities
June 22	20.0	78.15	1.85
June 30	15.8	82.20	2.00
July 10	18.0	79.80	2.20
July 30	19.0	79.10	1.90

The average yield of volatile oil of 18.2% might be considered very high, compared with that of other pines growing in California. The volatile oil of Western White Pine has the same pungent odor as the oleoresin, but even more penetrating.

The remainder of the oleoresin was shipped to Gainesville for chemical examination which was begun early in 1930. It had a sp gr by hydrometer of 1.002 at 23° C. On steam distillation in the same manner as above 7343.5 Gm gave 1328 Gm of oil or 18.08%. This oil was combined with that of the above 4 samples making a total of 1582.6 Gm for investigation. The hot rosin was strained through cheese cloth.

#### PROPERTIES OF THE ROSIN

When compared with standard cubes it graded WG and by immersion in brine solution showed a sp gr of 1.045 at 23° C. When a melting point was taken with a Thiele tube it began to soften at 37° C. It melted at 45-49° C and became completely liquid at 51° C. Its specific rotation in alcohol was -1.58° at 25° C. Acid value 147.3, ester value 14.9, iodine value 19.9.

## ANALYSIS OF THE OIL

*Preliminary Testing*—Clear and colorless Sp gr  $\frac{20}{20}$ , 0.8691 (by Westphal) Optical rotation  $\alpha_D +20.59^\circ$  at  $20^\circ\text{C}$  Ind of ref  $n_d$ , 1.4646 at  $23^\circ\text{C}$  When cooled to  $5^\circ\text{C}$  over night no separation took place Acid value 0.0, ester value 0.0 No oxygen or nitrogen compounds

*Distillation*—1582.6 Gm of oil was distilled at 2–4 mm making  $5^\circ$  cuts for the first distillation This was then fractionated with a Vigreux column, making the cuts as near one-degree intervals as possible After a total of four distillations the fractions were as follows

B P	Sp Gr $\frac{15}{15}$	Ref Ind $n_d$ at $26^\circ\text{C}$	Opt Rot $26^\circ\text{C}$	Wt Gm
155–156 (765 mm )	0.8734	1.4658	+13.30	48.0
156–157	0.8654	1.4638	+13.30	230.0
157–158	0.8656	1.4642	+13.30	279.3
158–159	0.8646	1.4640	+12.70	174.1
159–160	0.8674	1.4649	+11.06	98.7
160–161	0.8713	1.4667	+8.80	20.4
161–162	0.8817	1.4689	+6.95	11.2
162–163	0.8693	1.4672	+3.62	7.7
163–164	0.8729	1.4677	+0.16	8.2
43–44 (5 mm )	0.8656	1.4641	+9.85	151.8
44–45	0.8610	1.4634	+8.38	108.3
45–46	0.8702	1.4657	+6.12	53.5
46–47	0.8705	1.4659	+4.20	13.7
47–48	0.8830	1.4681	+3.00	16.4
48–50	0.8830	1.4658	+2.25	14.8
50–51	0.8679	1.4644	+3.25	8.8
51–52	0.8808	1.4664		3.1
52–54	0.8579	1.4624		3.5
54–55	0.8928	1.4681	+3.25	13.3
55–61	0.8499	1.4553		3.1
61–68	0.8816	1.4603		6.1
68–75	0.8390	1.4475	–2.20	26.0
75–85	0.8719	1.4538	+5.40	7.1
85–90	0.8965	1.4668	+10.05	11.4
90–95	0.9375	1.4797	+17.68	13.0
95–100	0.9659	1.4888	+22.40	6.6
100–105	0.9615	1.4938	+19.50	10.8
Near 105	0.8829	1.4554	–1.50	10.8
Residue		1.5001		23.1
Total				1387.8

While distilling over the last fraction (near 105) the contents of the flask exploded which might be attributed to sudden polymerization As indicated by the sp gr not running uniform, the oil appears to have one or more terpenes that polymerize easily (phellandrene ?) Because of this it would be difficult to estimate the % of sesquiterpenes which we would expect in the last four fractions

The sp gr was taken by a Mohr-Westphal balance or a 4-cc pycnometer when the quantity was not sufficient Determinations were taken at  $25^\circ\text{C}$  and corrected to  $\frac{15}{15}$ , using a correction of 0.00075 per degree

## IDENTIFICATION OF CONSTITUENTS

*d- $\alpha$ -Pinene*—The physical properties of the fraction boiling at 156–157° C and the nitrosyl chloride derivative proved the presence of *d- $\alpha$ -pinene*. The pinene nitrosyl chloride was prepared by the method of Wallach. It formed with ease and abundance and melted at 108° C. Taking the first five fractions as *d- $\alpha$ -pinene* the oil contains approx. 59.8% of this constituent.

*$\beta$ -Pinene*—Using 12 cc of the fraction 43–44° C (5 mm), nopinic acid was prepared according to the method of Wallach. It melted at 112° C but recrystallization raised it to 126° C. The physical properties are in close accordance with those recorded for  *$\beta$ -pinene*. Taking the seven fractions from 160–161° C to 45–46° C (5 mm) as  *$\beta$ -pinene* the oil contains approx. 26% of it.

*Limonene*—Before fractionation the oil had an odor reminding one of limonene. The fractions boiling between 50° C and 75° C (at 5 mm) had a more distinctive odor of it, but its tetrabromide could not be obtained. It is possible that the decrease in rotation changing to laevo and then to dextro again is due to *l*-limonene.

The fractions boiling between 46° C and 55° C (5 mm) were treated with dry HCl gas for sylvestrene and N<sub>2</sub>O<sub>3</sub> for the nitrosite of phellandrene but the results were negative.

The remaining fractions stood for 12 months before the investigation could be continued. They were kept in well-filled test-tubes protected from light.

*N-Undecane*—The fraction 68–75° C (5 mm) weighing 26.0 Gm was distilled over metallic sodium at 766.6 mm giving the following fractions:

B P	Sp Gr $\frac{15}{15}$	Ref Ind nd at 27° C	Wt in Gm
160–170		1.4490	2.0
170–175		1.4475	2.4
175–180	0.8174	1.4452	4.5
180–185	0.8063	1.4409	3.6
185–190	0.7803	1.4405	9.0

The last fraction (185–190) showed such a low sp gr and index of refraction that a paraffin hydrocarbon was suspected. 5 cc of it was treated with fuming H<sub>2</sub>SO<sub>4</sub> in accordance with the U. S. P. X test for kerosene in oil of turpentine. After centrifuging, 2.5 cc remained as a clear top layer. In order to get more of this hydrocarbon for identification the remaining fractions between 60° C and 90° C (5 mm) were treated in a similar manner and combined giving a total of 14.5 cc. In each case the H<sub>2</sub>SO<sub>4</sub> treatment was continued until the oil no longer imparted a color to the acid. The hydrocarbon was washed with aqueous K<sub>2</sub>CO<sub>3</sub> and dried over metallic sodium.

The boiling point was determined by distilling 10 cc in a 15-cc distilling flask, using an asbestos heating board, asbestos wrapping around the neck of the flask, a direct flame and a standardized Anschütz thermometer. The liquid was brought to boiling with the thermometer immersed in it. In this way the thermometer registered approx. 195° C. This was continued for several minutes and then the heat increased to such a point that the liquid would distil over at the rate of 30 drops per minute. The thermometer was then raised so that the center of the bulb was opposite the bottom of the side exit tube. 9 cc distilled over between 196.3

and 197.9° C (corr) at 761.4 mm. The distillation was stopped at this point to prevent superheating. The residue in the flask showed no discoloration.

The sample was taken (before the bubble) in an 8.5-cc Sprengel tube giving the following results:

at  $\frac{15}{16}$ , 0.7457, at  $\frac{15}{4}$ , 0.7451, at  $\frac{20}{20}$ , 0.7432, at  $\frac{20}{4}$ , 0.7422, at  $\frac{25}{25}$ , 0.7407

The melting point of the paraffin compound was taken as follows: 13 cc in a 1/2-oz prescription bottle was frozen by solid CO<sub>2</sub> and alcohol. A pentane thermometer was immersed in it during freezing. It solidified at approx. -26° C. The temperature of the bath was allowed to raise slowly. So determined, the m.p. was -26.1 to -25.8° C.

The index of refraction was taken at three different temperatures. The average of five readings at each temperature follows:  $n_d$  at 15° C, 1.4210,  $n_d$  at 20° C, 1.4193,  $n_d$  at 25° C, 1.4171.

The rotation in a 10-mm tube was zero.

A cryoscopic molecular weight determination in benzol gave 155.1. Required for C<sub>11</sub>H<sub>24</sub> 156.2.

Of the paraffin hydrocarbons having this empirical formula only one corresponds in above physical properties, viz, *n*-undecane. Branched compounds would naturally have a lower bubble point. So far as we are aware *n*-undecane has heretofore been identified only in the oleoresin of *Pinus excelsa* (2) and Pennsylvania petroleum (6).

The physical constants of this compound were recently determined by Shepard, Henne and Midgley (7). The source of their compound was petroleum. Inasmuch as it is exceedingly difficult to separate and purify the constituents of petroleum, *Pinus monticola* would seem to offer a good source of *n*-undecane for such a study.

*Sesquiterpenes*—Present but none identified. Polymerization prevents a determination of their %.

#### SUMMARY

The oleoresin of *Pinus monticola* Dougl., obtained from trees growing under unfavorable conditions in the Warner Mountains of California, has been investigated. The environment of the trees is described. Details of the oleoresin extraction are given, supplemented by tables of yield for oleoresin, oil and rosin. The properties of each are described. The oil contains *d*- $\alpha$ -pinene, 60%,  $\beta$ -pinene, 26%, *n*-undecane, 1-2%, and sesquiterpenes. Limonene is perhaps present.

#### LITERATURE CITED

- (1) Geo. B. Sudworth, 'Forest Trees of the Pacific Slope' Washington 1908
- (2) *Indian Forest Records* 9 (IV) Part II page 6
- (3) *U. S. Forest Serv. Bull.* 119, 22
- (4) *Bull. Dept. Geol. Sci. Univ. Cal.* 17 (11), 398
- (5) *U. S. Geol. Surv.*, Fourth Annual Rep. (1884), page 83
- (6) Maberry *J. A. C. S.*, 19 (1897) 419 and 482
- (7) *J. A. C. S.* 53 (1931) 1948

# BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts Baltimore, Maryland

## APPARATUS AND MANIPULATIONS

- Andrews Marvin J  
Determination of reasonable or permissible error in dispensing  
*Jour A Ph A*, 22 (1933) 755  
Wruble, Milton  
Studies in percolation III  
*Am J Pharm*, 105 (1933), 340

## PHARMACOPŒIAS AND FORMULARIES

- Anon  
Review of the new Danish Pharmacopœia  
*Pharm J*, 131 (1933), 31  
Meyer, Karl  
Review of the new Danish Pharmacopœia  
*Pharm Ztg* 78 (1933) 794  
Brown H Treves  
Proposed new formulæ for the British Pharmaceutical Codes Part II  
*Quart J Pharm & Pharmacol* (July 1933), 178

## PHARMACEUTICAL PREPARATIONS

- Bateson F R C  
Solution of arsenous and mercuric iodides  
*Quart J Pharm & Pharmacol* (July 1933) 189  
Brown H Treves  
Mistura Bismuthi Hydroxidi  
*Quart J Pharm & Pharmacol* (July 1933) 174  
Caines, Charles M and Evers Norman  
Compound tincture of cardamom Loss of color in certain mixtures  
*Quart J Pharm & Pharmacol* (July 1933), 158  
Eschenbrenner H  
Size of particles of mercury in mercurial ointment  
*Pharm Zentralh*, 74 (1933) 425  
Fantus, Bernard, et al  
Study of vehicles for medicines  
*Jour A Ph A*, 22 (1933) 751

- Haddock, L A  
Changes in acid solutions of adrenaline  
*Quart J Pharm & Pharmacol* (July 1933), 168  
Hersant E F and Linnell, W H  
Stability of ergot preparations  
*Pharm J*, 131 (1933) 5  
Jermstad Axel and Ostby, Ottar  
Fluidextract of thyme  
*Pharm Zentralh*, 74 (1933) 441  
Langevin, Lillian Mary  
Comparative study of the stability of emulsions with variation in the proportion of ingredients  
*Jour A Ph A*, 22 (1933), 728  
Monk H E  
Cod liver oil emulsion with hypophosphites  
*Chem & Drug*, 119 (1933), 64  
Morton, C  
Decomposition of acetylsalicylic acid in aqueous solution  
*Quart J Pharm & Pharmacol* (July 1933), 164  
Nielsen Leo  
Decomposition of sodium phenylethylbarbiturate in aqueous solution  
*Dansk Tids Farm* 7 (1933), 137  
Rae John  
Comparison of the action of various solvents on defatted cochineal  
*Quart J Pharm & Pharmacol* (July 1933) 155  
Smelt E M  
Keeping properties of Liquor arsenicalis  
*Quart J Pharm & Pharmacol* (July 1933) 47  
Smelt E M  
Keeping properties of liquid extract of ergot  
*Quart J Pharm & Pharmacol* (July 1933) 71  
Veness, B R  
Yield of extractive in unstandardised official extracts  
*Quart J Pharm & Pharmacol* (July 1933) 203  
Vermet J J  
Solution of iron albuminate  
*Pharm Weekbl* 70 (1933), 753

Woodard, W A, and Cowland, A N  
Stability of aqueous solutions of gallotannic acid  
*Quart J Pharm & Pharmacol* (July 1933), 35

## PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Baldinger L H, and Nieuwland, J A  
Relation of some physical properties to bactericidal action of some  $\alpha$ -phenylsubstituted acids

*Jour A Ph A*, 22 (1933), 711

Carleton, Alice

Uses and dangers of cosmetics

*Pharm J*, 137 (1933) 85

Dyer, F J

Estimation of parathyroid hormone

*Quart J Pharm & Pharmacol* (July 1933), 98

Dysart, B R

Death following the ingestion of 5 grains of acetylsalicylic acid

*J A M A* 101 (1933), 446

Epstein David

Paraldehyde in digitalis standardisation by the cat method

*Quart J Pharm & Pharmacol*, 6 (1933), 169

Fromberz, K

Evaluation on the frog of glycosides acting on the heart

*Arch expil Path Pharmacol* (1932) 168,  
through *Chem Abstr*, 27 (1933) 3775

Gage, J C

Variation in the susceptibility of mice to certain anesthetics

*Quart J Pharm & Pharmacol* (July 1933), 90

Gage J C

Standardized preparation of digitalin for injection

*Quart J Pharm & Pharmacol* 6 (1933) 161

Gunn, J W C and Epstein David

Comparison of the action of sapotoxin, strophanthin and certain snake venoms on the heart

*Quart J Pharm & Pharmacol* 6 (1933) 182

Hemmingsen, Axel Marius

Accuracy of insulin assay on white mice  
Part II

*Quart J Pharm & Pharmacol*, 6 (1933) 187

Knoefel, P K

Narcotic potency in the paraldehyde series

*J Pharmacol & Exper Therap*, 48 (1933)  
488

Horne W H, et al

p-Aminophenyl urethans as local anesthetics  
*J Am Chem Soc*, 55 (1933) 3435

Lefebure, Ernest

Contribution to the toxicological determination of cantharidin

*J pharm Belg*, 15 (1933), 527, 543

Lozinski, E, and Holden, G W

Relative activity of ergotoxine and ergotamine with special reference to the assay of ergot preparations

*Quart J Pharm & Pharmacol* (July 1933), 67

Morrell, C A, and Chapman C W

Determination of toxicity of arsphenamine I

Increase in toxicity on exposure to air

*J Pharmacol & Exper Therap*, 48 (1933), 375

Morrell, C A, and Chapman, C W

Determination of the toxicity of neoarsphenamine II Determination of characteristic curve for rats

*J Pharmacol & Exper Therap*, 48 (1933), 391

Samaan, Karam

Pharmacological action of visnagin

*Quart J Pharm & Pharmacol*, 6 (1933), 174

Shaw, Paul A

Toxicity and deposition of thallium in certain game birds

*J Pharmacol & Exper Therap*, 48 (1933) 478

Thompson Marvin R

Extraction and assay of crude ergot

*Jour A Ph A*, 22 (1933) 736

Turner B B, and Hulpieu H R

Antidotal action of sodium thiosulphate and dihydroxyacetone in cyanide poisoning

*J Pharmacol & Exper Therap*, 48 (1933) 445

Van de Velde, Alb J J

Biochemical assays

*J pharm Belg*, 15 (1933), 511

Wallace, E W, and Van Dyke H B

Cumulative poisoning by squill derivatives and ouabain

*J Pharmacol & Exper Therap*, 48 (1933) 430

Wokes Frank

Effect of calcium administration on the toxicity of carbon tetrachloride in mice

*Quart J Pharm & Pharmacol* (July 1933) 85

## BOTANY AND PHARMACOGNOSY

Chen A Ling and Chen, K K

The constituents of Wu Chu Yü (*Evodia rutæcarpa*)

*Jour A Ph A*, 22 (1933) 716

Dewar T

Histology of the leaves of *Digitalis Thapsi*

*Quart J Pharm & Pharmacol* (July 1933), 115

Lewis, S Judd and Wombwell, J

Spectroscopic investigation of gum acacia  
*Quart J Pharm & Pharmacol* (July 1933)



- Smelt, E M  
Chemical tests for strophanthus  
*Quart J Pharm & Pharmacol* (July 1933)  
139
- Strozewicz Wacław J  
Analysis of caraway  
*Wiadomości Farm*, 60 (1933), 285, 299 315,  
through *Chem Abstr*, 27 (1933), 3779
- Wallis, T E, and Dewar, T  
Buchu leaves and other species of *Barosma*  
Comparative study of the anatomy  
*Quart J Pharm & Pharmacol* (July 1933), 19

### ALKALOIDS AND GLUCOSIDES

- Boehn, Theodor  
Chemistry of morphine and the derivatives of  
pharmaceutical importance  
*Apoth-Ztg*, 48 (1933) 845, 861, 875
- Boullet, J and Leulier, Maurice  
Some camphocarbonates of alkaloids  
*J pharm chim*, 18 (1933), 49
- Fulton, Charles C  
Identification of cocaine and novocaine  
*Am J Pharm* 105 (1933), 326
- Ghouse M, and Katti, M C Tummin  
Rhaponticin and anthraquinone derivatives  
from *Rheum emodi* Wall  
*J Indian Inst Sci*, 16A Pt 1 (1933), 1,  
through *Chem Abstr*, 27 (1933) 3777
- Jurkowski Adam, and Poznanski, Fr  
Remarks on the methods of determination of  
alkaloids in the products and the raw ma-  
terial of *Solanaceæ*  
*Wiadomości Farm*, 60 (1933) 133 through  
*Chem Abstr* 27 (1933), 3779
- Monnet R  
Reaction of erythroquinine, its specificity and  
method of carrying it out  
*J pharm chim* 18 (1933), 59
- Offerhaus C, and Baert C G  
Anesthetics, particularly cocaine and novocaine  
*Pharm Weekbl*, 70 (1933) 826
- Stoll A and Kreis, W  
True digitalis glucosides  
*Munch med Wochschr*, 80 (1933) 723  
through *Chem Abstr* 27 (1933), 3777
- Ware Alan H and Smith Victor  
Precipitation of alkaloids by tannins and the  
use of antipyrine in the detection of tannins  
*Quart J Pharm & Pharmacol* (July 1933),  
126

### ESSENTIAL OILS

- Anon  
Aniseed, fennel and star-anise oil  
*Parfums France*, 11 (1933) 106, through  
*Pharm J*, 137 (1933) 37

- Berry, Philip, and Swanson, Thomas B  
Determination of the freezing point of a mixture  
of pure ortho-cresol and pure cineole  
*Perf & Ess Oil Rec* 24 (1933) 224
- Jancsek, Miklos  
Evaluation of ethereal oils  
*Kiserletungy. Közlemenyek*, 35 (1933) 233,  
through *Chem Abstr*, 27 (1933), 3777

### OILS FATS AND WAXES

- Dyer F J  
Relationship between antimony trichloride  
blue value of cod liver oils and their un-  
saponifiable fractions  
*Quart J Pharm & Pharmacol* (July 1933), 2
- Evers, Norman, and Smith Wilfred  
Analytical classification of fish liver oils  
*Quart J Pharm & Pharmacol* (July 1933), 1
- Lewkowitsch Elsa  
Note on the composition of cacao butter  
*J Soc Chem Ind* 52 (1933) 236T
- Schuette H A and Chang C Y  
Hazelnut oil  
*J Am Chem Soc* 55 (1933), 3326

### ANALYTICAL METHODS AND RESULTS

- Allport Noel L  
New method for the determination of ele-  
mental sulphur  
*Quart J Pharm & Pharmacol* (July 1933),  
103
- Bennett C T and Campbell N R  
Determination of iron  
*Quart J Pharm & Pharmacol* (July 1933)  
108
- Dietzel R, and Sæholm K  
Studies on the degree of purity of official drugs  
*Pharm Ztg* 78 (1933) 769
- Elek A and Hill, D W  
Micro estimation of sulphur and phosphorus in  
organic compounds  
*J Am Chem Soc*, 55 (1933) 3479
- Ferrey G J W  
Determination of moisture in mercuric oxide  
*Quart J Pharm & Pharmacol* (July 1933), 78
- Ferrey G J W  
Note on the B P limit test for more soluble  
sugars in lactose  
*Quart J Pharm & Pharmacol* (July 1933), 83
- Glass, Norman  
Variation in the solubility of calcium lactate  
*Quart J Pharm & Pharmacol* (July 1933)  
194

Woodard W A , and Cowland, A N  
Stability of aqueous solutions of gallotannic acid

*Quart J Pharm & Pharmacol* (July 1933), 35

## PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Baldinger, L H , and Nieuwland, J A  
Relation of some physical properties to bactericidal action of some  $\alpha$ -phenylsubstituted acids

*Jour A Ph A* , 22 (1933) 711

Carleton, Alice

Uses and dangers of cosmetics

*Pharm J* 137 (1933) 85

Dyer, F J

Estimation of parathyroid hormone

*Quart J Pharm & Pharmacol* (July 1933), 98

Dysart, B R

Death following the ingestion of 5 grains of acetylsalicylic acid

*J A M A* 101 (1933), 446

Epstein, David

Paraldehyde in digitalis standardisation by the cat method

*Quart J Pharm & Pharmacol* 6 (1933), 169

Fromberz, K

Evaluation on the frog of glycosides acting on the heart

*Arch expil Path Pharmacol* (1932) 168,  
through *Chem Abstr* 27 (1933), 3775

Gage, J C

Variation in the susceptibility of mice to certain anesthetics

*Quart J Pharm & Pharmacol* (July 1933), 90

Gage J C

Standardized preparation of digitalin for injection

*Quart J Pharm & Pharmacol* , 6 (1933) 161

Gunn, J W C , and Epstein David

Comparison of the action of sapotoxin, strophanthin and certain snake venoms on the heart

*Quart J Pharm & Pharmacol* 6 (1933), 182

Hemmingsen, Axel Marius

Accuracy of insulin assay on white mice  
Part II

*Quart J Pharm & Pharmacol* 6 (1933) 187

Knoefel P K

Narcotic potency in the paraldehyde series

*J Pharmacol & Exper Therap* 48 (1933)  
488

Horne, W H , et al

p-Aminophenyl urethans as local anesthetics

*J Am Chem Soc* 55 (1933) 3435

Lefebure, Ernest

Contribution to the toxicological determination of cantharidin

*J pharm Belg* , 15 (1933), 527, 543

Lozinski, E , and Holden, G W

Relative activity of ergotoxine and ergotamine with special reference to the assay of ergot preparations

*Quart J Pharm & Pharmacol* (July 1933), 67

Morrell, C A , and Chapman, C W

Determination of toxicity of arsphenamine I  
Increase in toxicity on exposure to air

*J Pharmacol & Exper Therap* 48 (1933), 375

Morrell, C A , and Chapman, C W

Determination of the toxicity of neoarsphenamine II Determination of characteristic curve for rats

*J Pharmacol & Exper Therap* , 48 (1933) 391

Samaan, Karam

Pharmacological action of visnagin

*Quart J Pharm & Pharmacol* , 6 (1933), 174

Shaw, Paul A

Toxicity and deposition of thallium in certain game birds

*J Pharmacol & Exper Therap* 48 (1933), 478

Thompson Marvin R.

Extraction and assay of crude ergot

*Jour A Ph A* , 22 (1933) 736

Turner B B and Hulpieu H R

Antidotal action of sodium thiosulphate and dihydroxyacetone in cyanide poisoning

*J Pharmacol & Exper Therap* , 48 (1933) 445

Van de Velde, Alb J J

Biochemical assays

*J pharm Belg* , 15 (1933) 511

Wallace, E W , and Van Dyke, H B

Cumulative poisoning by squill derivatives and ouabain

*J Pharmacol & Exper Therap* , 48 (1933) 430

Wokes, Frank

Effect of calcium administration on the toxicity of carbon tetrachloride in mice

*Quart J Pharm & Pharmacol* (July 1933), 80

## BOTANY AND PHARMACOGNOSY

Chen, A Ling, and Chen, K K

The constituents of Wu Chu Yu (*Erodia rutæcarpa*)

*Jour A Ph A* , 22 (1933) 716

Dewar T

Histology of the leaves of *Digitalis Thapsi*

*Quart J Pharm & Pharmacol* (July 1933), 110

Lewis, S Judd and Wombwell J

Spectroscopic investigation of gum *acacia*  
*Quart J Pharm & Pharmacol* (July 1933)

Smelt, E M

Chemical tests for strophanthus

*Quart J Pharm & Pharmacol* (July 1933), 139

Strozewicz, Wacław J

Analysis of caraway

*Wladomosci Farm* 60 (1933), 285 299, 315, through *Chem Abstr*, 27 (1933) 3779

Wallis, T E, and Dewar, T

Buchu leaves and other species of *Barosma*  
Comparative study of the anatomy

*Quart J Pharm & Pharmacol* (July 1933), 19

## ALKALOIDS AND GLUCOSIDES

Boehn, Theodor

Chemistry of morphine and the derivatives of pharmaceutical importance

*Apoth Ztg*, 48 (1933), 845, 861, 875

Bouillot J, and Leulier Maurice

Some camphocarbonates of alkaloids

*J pharm chim*, 18 (1933) 49

Fulton Charles C

Identification of cocaine and novocaine

*Am J Pharm*, 105 (1933), 326

Ghouse, M, and Kattu M C Tummin

Rhaponticin and anthraquinone derivatives from *Rheum emodi* Wall

*J Indian Inst Sci*, 16A, Pt 1 (1933), 1, through *Chem Abstr*, 27 (1933), 3777

Jurkowski, Adam, and Poznanski, Fr

Remarks on the methods of determination of alkaloids in the products and the raw material of Solanaceae

*Wladomosci Farm*, 60 (1933), 133, through *Chem Abstr* 27 (1933), 3779

Monnet R

Reaction of erythroquinine, its specificity and method of carrying it out

*J pharm chim*, 18 (1933), 59

Offerhaus, C, and Baert, C G

Anesthetics, particularly cocaine and novocaine  
*Pharm Weekbl* 70 (1933), 826

Stoll, A, and Kreis, W

True digitalis glucosides

*Munch med Wochschr* 80 (1933) 723, through *Chem Abstr*, 27 (1933) 3777

Ware, Alan H and Smith, Victor

Precipitation of alkaloids by tannins and the use of antipyrine in the detection of tannins

*Quart J Pharm & Pharmacol* (July 1933), 126

## ESSENTIAL OILS

Anon

Aniseed, fennel and star-anise oil

*Parfums France* 11 (1933) 106, through *Pharm J* 137 (1933), 37

Berry, Philip, and Swanson Thomas B

Determination of the freezing point of a mixture of pure ortho-cresol and pure cineole

*Perf & Ess Oil Rec*, 24 (1933), 224

Jancsek Miklos

Evaluation of ethereal oils

*Kisérletugy, Kozlemenyzek*, 35 (1933), 233, through *Chem Abstr*, 27 (1933), 3777

## OILS, FATS AND WAXES

Dyer G J

Relationship between antimony trichloride blue value of cod liver oils and their unsaponifiable fractions

*Quart J Pharm & Pharmacol* (July 1933) 2

Evers, Norman, and Smith Wilfred

Analytical classification of fish liver oils

*Quart J Pharm & Pharmacol* (July 1933), 1

Lewkowsch Elsa

Note on the composition of cacao butter

*J Soc Chem Ind*, 52 (1933), 236T

Schuette, H A, and Chang C Y

Hazelnut oil

*J Am Chem Soc* 55 (1933) 3326

## ANALYTICAL METHODS AND RESULTS

Allport, Noel L

New method for the determination of elemental sulphur

*Quart J Pharm & Pharmacol* (July 1933), 103

Bennett, C T and Campbell, N R

Determination of iron

*Quart J Pharm & Pharmacol* (July 1933), 108

Dietzel R and Saxholm, K

Studies on the degree of purity of official drugs  
*Pharm Ztg* 78 (1933), 769

Elek, A and Hill D W

Micro estimation of sulphur and phosphorus in organic compounds

*J Am Chem Soc* 55 (1933) 3479

Ferrey G J W

Determination of moisture in mercuric oxide

*Quart J Pharm & Pharmacol* (July 1933), 78

Ferrey G J W

Note on the B P limit test for more soluble sugars in lactose

*Quart J Pharm & Pharmacol* (July 1933), 83

Glass Norman

Variation in the solubility of calcium lactate

*Quart J Pharm & Pharmacol* (July 1933) 194

TABLE VII—PRESCRIPTION NO 12 (CORRECT WEIGHT OF EACH CAPSULE = 6 GRAINS)

Batch No	1	2	Weight of Each Capsule in Grains						7	8	Total Wt in Grains	Average Wt in Grains	S D <sup>1</sup>
1	5 875	5 875	6 000	6 125	6 000	6 000	6 125	5 875	47 875	5 984	0 075		
2	5 875	6 000	6 000	6 125	6 000	6 125	6 125	5 750	48 000	6 000	0 124		
3	6 500	6 375	6 250	6 500	6 125	6 000	7 000	5 750	50 500	6 310	0 353		
4	5 875	6 625	6 375	6 000	5 750	5 875	7 000	5 625	49 500	6 197	0 451		
5	5 875	5 750	6 000	6 125	5 750	5 875	6 250	5 625	47 250	5 906	0 190		
6	5 875	5 750	5 625	6 000	5 750	5 875	6 375	5 625	46 875	5 859	0 228		
7	5 875	5 875	5 875	5 875	6 000	5 875	5 125	5 750	47 250	5 906	0 103		
8	6 125	6 375	5 875	6 000	6 250	5 750	6 000	5 750	48 125	6 015	0 211		
9	5 625	5 750	5 875	6 000	6 000	6 000	6 125	4 500	45 875	5 734	0 440		
10	6 000	6 000	6 250	6 500	6 375	6 250	6 500	6 000	49 875	6 234	0 201		
11	5 875	6 000	5 875	6 000	6 125	6 000	6 250	5 875	48 000	6 000	0 124		
12	6 125	6 000	6 250	6 500	6 375	6 250	6 500	6 125	50 125	6 265	0 170		
13	6 250	6 125	6 125	6 000	5 750	6 000	6 250	5 250	47 750	5 968	0 310		
14	6 000	6 000	6 000	5 875	6 125	6 125	6 125	5 000	47 250	5 906	0 352		
15	5 500	6 375	5 875	6 250	6 000	5 875	6 125	5 750	47 750	5 968	0 263		
16	6 500	6 000	6 125	5 750	6 125	6 000	5 875	6 125	48 500	6 063	0 207		
17	6 250	6 250	6 375	5 875	6 000	6 125	6 625	5 625	49 125	6 140	0 295		
18	6 500	5 500	5 750	5 750	5 750	6 250	6 500	5 125	47 125	5 891	0 456		
19	6 125	6 250	6 250	6 375	5 750	6 000	5 875	6 000	48 625	6 078	0 197		
20	5 750	6 250	6 000	6 125	6 125	6 000	6 375	5 250	47 875	5 984	0 327		
21	5 875	6 125	6 125	6 250	5 750	5 875	6 250	6 375	48 625	6 078	0 206		
22	6 000	5 750	6 000	5 750	6 125	6 000	6 250	6 125	48 000	6 000	0 165		
23	6 375	6 250	6 125	5 625	6 000	5 500	5 875	5 500	47 250	5 906	0 317		
24	5 500	6 500	5 625	5 875	6 250	6 125	6 000	6 000	48 875	5 984	0 302		
25	5 250	6 125	5 750	6 000	5 875	6 250	6 500	5 125	46 875	5 859	0 443		
26	5 750	5 875	5 875	6 250	6 125	6 125	6 250	5 375	47 625	5 953	0 278		
27	6 375	5 750	6 000	6 250	6 000	6 125	6 375	5 125	48 000	6 000	0 385		
28	5 625	5 875	5 750	5 500	6 000	5 500	6 000	5 375	45 625	5 703	0 224		
29	5 875	6 000	6 000	6 000	6 000	6 000	6 125	5 500	47 500	5 937	0 176		
30	5 750	5 625	5 875	5 875	5 750	5 875	6 000	5 375	46 125	5 766	0 181		

<sup>1</sup> Av S D = 0.258 which is equivalent to an average deviation from the theoretical of 4.30%

TABLE VIII—PRESCRIPTION NO 12 (CORRECT PERCENTAGE OF CALOMEL = 33.33)

Batch No			Per Cent of Calomel in Each Capsule								Average Per Cent	S D
	1	2	3	4	5	6	7	8				
1	34 31	33 80	34 46	33 46	33 08	34 57	32 51	35 23	33 93	0 980		
2	34 71	32 65	28 34	32 65	28 34	33 32	33 35	34 32	32 21	2 310		
3	34 23	33 30	29 38	33 75	31 39	25 26	29 86	30 59	30 97	2 540		
4	33 27	34 00	33 12	33 86	33 15	33 25	33 36	33 37	33 42	0 306		
5	28 90	29 20	28 83	28 82	28 69	30 44	30 40	31 08	29 55	0 878		
6	35 27	36 05	36 08	35 18	34 93	35 06	36 92	38 82	36 04	1 220		
7	33 28	32 64	33 75	34 75	33 09	32 61	34 04	34 46	33 58	0 753		
8	31 44	31 00	31 08	33 15	29 19	31 15	30 90	32 26	31 27	1 060		
9	36 08	36 67	36 45	35 76	37 39	35 55	36 92	34 49	36 16	0 804		
10	32 00	33 50	33 75	32 89	32 50	33 25	33 35	33 65	33 11	0 568		

<sup>1</sup> Av S D = 1.15 which is equivalent to an average deviation from the theoretical of 3.44%

With respect to the weight of the capsules filled Table VII shows the average standard deviation to be 0.258 grains or 4.30% of the prescribed amount. Sixteen of the 30 batches filled fall within the average S D and the remaining 14 fall within twice the average S D.

In the case of the calomel content, the average standard deviation amounts to 1.147 per cent based on a theoretical calomel content of 33.33 per cent. Seven of the 10 batches fall within the average S. D. and the remaining 3 fall within twice the average S. D. The comment made under the prescription for calomel powders applies equally as well in this instance.

#### PRESCRIPTIONS NOS 13-19

The remaining 7 prescriptions were only examined for errors in weight. Before giving them out to be filled, the students were instructed as to the method to be followed, and they were told that their work would be checked for accuracy.

The extent to which each of the following factors contributed to the total error is shown in Tables IX and X. Nature and number of ingredients, number of capsules in each batch, amount of material in each capsule and *modus operandi* of filling.

TABLE IX.—STANDARD DEVIATION OF PRESCRIPTIONS NOS 13-15

Batch No	No 13	Prescriptions No 14	No 15
1	0.260	0.296	0.255
2	0.222	0.268	0.405
3	0.408	0.280	0.330
4	0.255	0.346	0.196
5	0.148	0.270	0.170
6	0.247	0.097	0.302
7	0.401	0.254	0.223
8	0.240	0.348	0.211
9	0.152	0.167	0.192
10	0.386	0.466	0.206
11	0.411	0.357	0.176
12	0.404	0.154	0.338
13	0.348	0.422	0.220
14	0.168	0.394	0.264
15	0.178	0.408	0.357
16	0.327	0.464	0.344
17	0.325	0.261	0.376
18	0.108	0.328	0.337
19	0.257	0.103	0.260
20	0.434	0.406	0.346
21	0.088	0.374	0.264
22	0.211	0.391	0.204
23	0.430	0.478	0.356
24	0.410	0.425	0.175
25	0.356	0.151	0.384
26	0.153	0.220	0.308
27	0.192	0.414	0.383
28	0.388	0.456	0.166
29	0.396	0.437	0.374
30	0.273	0.334	0.207
Av S. D. =	0.286	0.326	0.277
Av % =	8.17	8.73	5.47

The extent to which the *modus operandi* of filling capsules affects the final error is comparable to that observed in the case of powders, and as in the case of powders, the method in which the individual doses are divided off by weighing is the most accurate. This is clearly shown in the results obtained for prescription No. 16 in which 22 of the 40 batches of capsules filled fall within the average S. D. and the remaining 18 within twice the average S. D., and in prescription No. 17, in which 25 of the 40 batches of capsules filled fall within the average S. D. and the remaining 15 within twice the average S. D.

TABLE X—STANDARD DEVIATION OF PRESCRIPTIONS NOS 16-19

Batch No	Prescriptions			
	No 16	No 17	No 18	No 19
1	0 256	0 261	0 138	0 522
2	0 506	0 234	0 348	0 145
3	0 215	0 307	0 153	0 332
4	0 147	0 325	0 246	0 668
5	0 454	0 212	0 419	0 395
6	0 258	0 118	0 130	0 403
7	0 144	0 235	0 180	0 669
8	0 236	0 247	0 294	0 068
9	0 305	0 259	0 154	0 324
10	0 088	0 235	0 271	0 373
11	0 464	0 225	0 141	0 411
12	0 046	0 254	0 200	0 645
13	0 104	0 195	0 274	0 593
14	0 252	0 144	0 415	0 395
15	0 080	0 209	0 263	0 148
16	0 213	0 346	0 292	0 320
17	0 421	0 263	0 322	0 141
18	0 483	0 347	0 204	0 218
19	0 316	0 128	0 281	0 161
20	0 374	0 275	0 410	0 359
21	0 114	0 416	0 129	0 038
22	0 072	0 382	0 332	0 310
23	0 374	0 299	0 293	0 642
24	0 054	0 401	0 360	0 621
25	0 438	0 207	0 229	0 142
26	0 443	0 405	0 405	0 636
27	0 061	0 267	0 339	0 510
28	0 325	0 427	0 366	0 204
29	0 207	0 330	0 294	0 524
30	0 210	0 416	0 413	0 518
31	0 314	0 260	0 322	0 512
32	0 425	0 243	0 130	0 552
33	0 318	0 218	0 342	0 609
34	0 207	0 461	0 134	0 484
35	0 243	0 454	0 421	0 791
36	0 252	0 275	0 417	0 574
37	0 350	0 108	0 335	0 528
38	0 117	0 242	0 144	0 196
39	0 284	0 475	0 416	0 625
40	0 135	0 204	0 195	0 448
Av S D	= 0 257	0 283	0 279	0 419
Av %	= 4 11	10 95	6 69	4 05

The method of blocking and dividing is next in accuracy, as shown by the results obtained for prescription No 13. In this instance 16 of a total of 30 batches fall within the average S D and the remaining 14 fall within twice the average S D. The results obtained for prescription No 15 are similar in character and furnish added proof of the correctness of the above statement.

The method in which the capsules are filled by packing directly from the bulk material is the least accurate of the methods tested. This is shown to be true by the results obtained for prescription No 14 in which case 12 of a total of 30 batches fall within the average S D, while 18 fall within twice the average S D. Further proof for the correctness of this statement is furnished by the results obtained for prescription No 18.

The nature of the ingredients of the prescription is a factor responsible for a part of the total error. This is shown by the results obtained for prescriptions Nos. 13 and 15.

Likewise, the number of ingredients is a factor to be reckoned with. The greater the number of ingredients, the greater the number of weighings and transfers, each of which presents opportunities to err. This is shown to be true by results obtained for prescriptions Nos. 12, 13, 14 and 18.

The magnitude of the error made seems to depend to some extent on the number of capsules in each batch. Apparently, the greater the number of capsules filled, the greater the chance for error. This is shown by results obtained for prescriptions Nos. 12, 13, 14, 15, 16 and 18.

The effect of weight of the contents of individual capsules on the final error is of the same general order as that observed in the case of powders. Likewise, as in the case of powders, the average S. D. increases as the weight increases, whereas the percentage deviation from the theoretical amount decreases, correspondingly. This is shown in the table immediately following.

TABLE XI—EFFECT OF WEIGHT OF INDIVIDUAL CAPSULES ON STANDARD DEVIATION

Prescription Number	Theoretical Weight of Each Capsule in Grains	Average Standard Deviation	Percentage Deviation from the Theoretical
17	2 1/4	0.283	10.95
13	3 1/4	0.286	8.17
15	5	0.277	5.47
16	6 1/4	0.257	4.11
19	10 1/4	0.419	4.05

TABLE XII—SUMMARY OF RESULTS

Prescription Number	Average S. D.	Number of Batches of Capsules Falling within		Percentage of Batches of Capsules Falling within	
		1 X S. D.	2 X S. D.	1 X S. D.	2 X S. D.
12	0.258	16	14	53.33	46.66
13	0.286	16	14	53.33	46.66
14	0.326	12	18	40.00	60.00
15	0.277	16	14	53.33	46.66
16	0.257	22	18	55.00	45.00
17	0.283	25	15	62.50	37.50
18	0.279	18	22	45.00	55.00
19	0.419	20	20	50.00	50.00
Totals		145	135	51.76	48.21

The results obtained with prescriptions calling for capsules are summarized in Table XII. It will be observed that they are almost identical with those obtained for powders, so that further comment is unnecessary. Twice the standard deviation was suggested as the limit of reasonable or permissible error for the preparation of powders, and since all batches of the capsules prepared fall within this limit, the acceptance of the same standard would appear to be justified.

*(To be continued)*

#### METHYLATED SPIRIT DRINKING IN SCOTLAND

The magistrates of Glasgow resolved to suggest to the Secretary of State for Scotland that legislation should be introduced to have the sale of methylated spirits more strictly controlled than it is to day. The object in view is the repression of methylated spirits drinking, which has come to be a very great evil in the city.

On the motion of Bailie John Henderson, the magistrates unanimously adopted a suggestion made by the Chief Constable, and instructed the Town Clerk to draft representations to lay before the Secretary of State for Scotland in favor of legislation under which methylated spirits would be included in the category of a poison within the meaning of the Dangerous Drugs Act, or that at all events the right of sale would be vested only in fully qualified chemists.

## SYRUP OF TOLU

BY J A W LUCK

The freshly prepared syrup of tolu made by the U S P X process has a yellow color. On standing the syrup darkens, not infrequently becoming dark brown if the syrup is kept for a period of months. Curiously the syrups of tolu dispensed by some pharmacists are colorless and insipid liquids. These syrups are usually slightly acid and are decidedly inferior in odor and taste to those made by the official process.

Although a colorless, weakly acid syrup of tolu may be prepared comparable in odor, taste and therapeutic value to one made by the prescribed formula, it is an advantage in pharmaceutical practice to have either a neutral or slightly alkaline syrup. However, neutral and alkaline syrups of tolu are always colored, the intensity of the color increasing with an increase of the hydroxyl-ion concentration of the syrups.

Syrup of tolu contains the alcohol-water soluble constituents of balsam of tolu in the proportion of 1 Gm of the latter to 100 cc of the finished syrup. For the sake of convenience the official tincture of tolu is used. The syrup, therefore, contains about 4% of alcohol by volume.

The principal therapeutic agent of the official syrup is cinnamic acid in the form of its magnesium salt. The U S P X does not prescribe a standard for the free cinnamic acid content of balsam of tolu. Hence, it is to be expected that great variations will be found in the cinnamic acid content of syrups of tolu obtainable

TABLE I

	I	II	Color	Litmus	Phenol phthal	Conc HCl	Sol NaOH	Color on Standing	Methyl Violet
1	10 0		y	Blue	Red	Ppt cd	Darker		Bluish
2	2 0	50	y	Blue	Pink	Ppt cd	Darker	Orange 32	Bluish
3	1 5	50	ly	Blue	nc	Ppt cd	Darker	Orange 32	Bluish
4	1 0	50	py	Blue	nc	Ppt cd	Darker	Yellow 32	Bluish
5	0 6	50	nc	Red	nc	Ppt	Yellow		Bluish
6		50	nc	Red	nc		py		Bluish
7	Fluid	Tolu	nc	Red	nc				Violet

I Mag Carb II Talcum, y, ly, py, yellow, light yellow, pale yellow, respectively, nc no color, cd color discharged, ppt precipitate, 32 number of days in contact

TABLE II—SOLUBILITY OF CINNAMIC ACID IN ALCOHOL WATER SOLUTIONS AT 18°-19° C

Alcohol, % by volume	0	1 06	3 9	5 0	10 0	15 0	20 0	24 7	27 2	30 1
Cinnamic acid, Gm per L sol	0 417	0 43	0 5	0 53	0 58	0 73	0 92	1 18	1 5	1 84
Total HCl in Gm per L sol					9 71	9 86	10 05	10 31	10 63	10 97

in the open market. Tschirch (1), Vezes et Dupont (2) and Dieterich (3) all state that balsam of tolu contains from 12 to 15% of free cinnamic acid. The latter calls attention to a steady decrease in the free cinnamic acid content of balsams of tolu delivered in the Hamburg market. Hager (4) as well as Tschirch (1) refer to the work of Spillsbury and Joyce who state that good balsam of tolu contains at least 18% of free cinnamic acid. The latter figure is also given by the National Dispensatory.



The magnesium carbonate of the official process serves a twofold purpose. It acts as an adsorbent for the water-insoluble portion and reacts with the free acids of the balsam to form the more soluble magnesium salt. Calcium phosphate, talcum (5) and fine sand are also used as adsorbents. The syrups made by using the latter three are merely flavored sugary solutions of the free acids. Nothing seems to have been published about the coloring substance of syrup of tolu. This substance is colorless in acid solutions and yellow in alkaline solutions.

Many manufacturers of pharmaceuticals market a preparation called "Fluid Tolu Soluble." This product when mixed with simple syrup is supposed to give the official syrup. Lately, some manufacturers have omitted the word official. The fluids tolu soluble are, therefore, concentrated solutions of the hydro-alcoholic soluble components of the balsam. These concentrated solutions are mostly colorless and yield syrups whose color does not change on standing. They are, however, deficient in both odor and taste. Examination of the catalogs of various manufacturers reveals a lack of uniformity in the alcohol content and in the proportion of mixing of the fluid tolu with the simple syrup. All of these concentrations give syrups of a lower alcohol content than the official syrup. Still greater differences are noticeable when a fluid of tolu is compared with the filtrate obtained by the official procedure. The comparison was extended to include solutions made with smaller quantities of magnesium carbonate together with talcum and talcum alone. All of these were prepared without sugar. In some of these tests the mixtures were kept unfiltered for one hour to four weeks. The fluid of tolu tested was labeled to contain 27% of alcohol by volume. The results are listed in Table I.

These tests show that the concentration and intensity of the dissolved coloring substance is a function of the hydroxyl-ion concentration. The coloring substance is slightly soluble in weakly acid solutions in its colorless form. These solutions become colored upon the addition of an alkaline solution.

The coloring substance is abstracted from both the acid and alkaline solutions by wool. When this wool is dyed with methyl violet it takes on a bluer shade than wool dyed with methyl violet only. A few drops of a solution of methyl violet added to the solutions enumerated in Table I impart to them a color which is blue by transmitted light and turbid coppery by reflected light. The turbidity is greatest in alkaline solutions from which the coloring matter soon precipitates. In weakly acid solutions the blue color is noticeable only by comparing it with the color of an equal quantity of methyl violet in distilled water. When to one drop of tincture of tolu, diluted with alcohol, water is added until the solution becomes but slightly turbid, the addition of methyl violet solution and one drop of solution of sodium hydroxide produces a red color which turns blue upon the addition of a large quantity of water. This change in the color of the methyl violet is probably due to the adsorption of the yellow coloring substance of the solutions tested by the methyl violet.

Many other substances have a similar effect upon methyl violet. Dilute solutions of *p*-nitrophenol, picric acid, 3,4-nitrochlorbenzenesulphonic acid, salicylic acid and anilin appear bluish to a greater or lesser degree upon the addition of methyl violet. Neither solutions of cinnamic, gallic and tannic acid nor nitrobenzene give such a color change. A saturated solution of picric acid to which methyl violet has been added forms a precipitate which upon dispersing by shaking appears

green by transmitted light. Upon diluting this mixture with a large quantity of water the transmitted light becomes blue.

The fluid tolu soluble compared with the solutions listed in Table I shows a somewhat similar behavior as Solution 6 in which only talcum was used as the adsorbent. The latter solution may be considered as a saturated solution of cinnamic acid containing in addition small quantities of odor and taste-bearing substances, a coloring substance in its colorless form and approximately 8.3% of alcohol by volume. However, the fluid tolu contained 27% of alcohol and was labeled to give the official syrup in the proportion of 1 to 20 parts of the finished syrup. Therefore, it should be over nine times stronger than the solution obtained by the official process. Consequently, by the addition of conc. HCl a voluminous precipitate of cinnamic acid should be formed. The absence of a precipitate and the lack of color changes by the addition of methyl violet and alkali solutions casts a doubt upon the origin of this fluid tolu.

The solubility of a substance in water is usually considerably changed by the addition of other soluble substances. This change in solubility may be calculated when the physical constants involved are known. The change in solubility of a substance by the addition of a small quantity of another is frequently very small and for practical purposes may be neglected. Thus, it will be assumed that the maximum amount of cinnamic acid and magnesium cinnamate contained in the fluid tolu is identical with their solubility in an alcohol-water mixture of similar alcoholic content. Since no solubility data of either cinnamic acid or magnesium cinnamate in alcohol-water mixtures have been published, these were determined at a temperature between 18° and 19° C. As no thermostat was available the solutions were kept in a closet which was known to have a fairly constant temperature. After two weeks during which the solutions were shaken frequently, the solutions containing some of the solid phase were transferred to a room the temperature of which was practically constant. The temperatures of the room and of the solutions were observed frequently and after two hours the solutions were filtered into dry flasks. The concentrations of the filtered solutions were determined as time presented itself. The solubility of each in commercial distilled water was also determined.

The solubility of HCIn in water at varying temperatures was determined by Mayer (6) who found the values at 18° and 25° C. to be 0.420 and 0.546 Gm., at 25° C. by Loevenharz (7) as 0.491 Gm. and by Larsson (8) as 0.495 Gm., all per l. of solution. The dissociation constant at 25° C. was determined by Ostwald (9) as  $3.55 \cdot 10^{-5}$  and by Larsson (10) as  $3.8 \cdot 10^{-5}$ . Since the dielectric constant of alcohol is less than that of water it follows that the ionization of substances in alcohol-water mixtures decreases with the increase in the alcohol concentration of the solution. This effect is largely eliminated by diluting the solution with a large volume of water.

The required indicator for the titration of HCIn may be calculated by considering the base, salts and the colored form of the indicator completely ionized. At the end-point the rates of reaction between the base and the indicator and the salt of the indicator and the acid should be equal. Therefore  $k_1/k_w = k_a/k_i$ , or  $k_i^2 = k_a k_w$ , where  $k_i^2$  is the indicator constant and  $k_a$  and  $k_w$  are the dissociation constants of the acid and water, respectively. Substituting the proper values

in the above equation and writing it in the form  $\text{pk}_i = \frac{1}{2}(\text{pk}_a + \text{pk}_w) = 18.45/2 = 9.23$  the required indicator constant is determined. Phenolphthalein may therefore be used as the indicator in the titration of HCIn. The solutions were titrated with a 0.1125*N* solution of sodium hydroxide. The alcohol effect was practically eliminated by diluting the solutions so that the alcohol content was less than 2.5% by volume. The results are represented in Table II and graphically by the solubility Curve A.

Magnesium cinnamate is the salt of a weak acid and base, and since HCIn is quite volatile, it cannot be prepared by the evaporation of its aqueous solution by means of heat. It may, however, be made easily by the interaction of a solution of an alkali cinnamate with a concentrated solution of a magnesium salt, provided that the resulting salts are more soluble than the magnesium cinnamate. Nearly complete separation may be attained if the mol concentration of the alkali cinnamate is small compared to that of the magnesium salt.

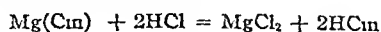
Beilstein (11) lists three salts each with 1, 2 or 3 molecules of water of crystallization. Tarugi and Checchi (12) refer to a salt containing 3 molecules of water, but do not give its method of preparation. Ephraim and Pfister (13) prepared a salt containing 4 molecules of water by adding  $\text{MgSO}_4$  to a solution of NaCIn. The solubility of this salt in water was determined by them at 20° C as 12.25 Gm per L. of solution.

For the determination of the alcohol-water solubility of magnesium cinnamate a sufficient quantity of it was prepared by adding a solution NaCIn equivalent to 8 Gm HCIn to a saturated solution containing 240 Gm of  $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ , stirring the solution rapidly. Crystals of magnesium cinnamate appeared immediately. After standing for some time the crystals were transferred to a filter, washed several times with ice cold water and finally with alcohol. The crystals were dried between filter paper at room temperature and transferred after three days to a glass-stoppered bottle.

This magnesium cinnamate crystallized in the form of small white, odorless and tasteless leaflets. Upon analyzing 0.113 Gm of this salt for magnesium by the pyrophosphate (14) method it yielded 0.0321 Gm of  $\text{Mg}_2\text{P}_2\text{O}_7$ . This corresponds to 0.1126 Gm of magnesium cinnamate of the formula  $\text{Mg}(\text{Cin})_2 \cdot 4\text{H}_2\text{O}$ . It is, therefore, identical to the salt prepared by Ephraim & Pfister (13).

The solutions of this salt in water and alcohol-water yielded upon analysis nearly identical quantities of  $\text{Mg}_2\text{P}_2\text{O}_7$ . The average of all of the 5 cc solutions was 0.0172 Gm of  $\text{Mg}_2\text{P}_2\text{O}_7$ . This is equivalent to 12.07 Gm of  $\text{Mg}(\text{Cin})_2 \cdot 4\text{H}_2\text{O}$  per L. of solution. The solubility of this salt in alcohol-water solutions up to 30% of alcohol by volume is the same as that in water. Magnesium benzoate is also similarly soluble in both solvents.

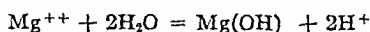
The above result was checked by titrating the solutions of  $\text{Mg}(\text{Cin})_2$  with a standard solution of HCl. In the reaction



at completion both  $\text{MgCl}_2$  and HCIn are present in the solution. When 5 cc of a saturated solution of  $\text{Mg}(\text{Cin})_2$  at 20° C is diluted to a volume of 50 cc the concentration of the solution becomes  $6.28 \cdot 10^{-3}$  Gm equivalents. Since the solubility of HCIn at the same temperature is  $2.82 \cdot 10^{-3}$  Gm equivalents, upon the addition

of HCl solid cinnamic acid separates from the solution. The  $H^+$  concentration of a saturated aqueous solution of HCIn may be computed by means of the relation  $H^+ = (k_a c_a)^{1/2}$  and is  $3.16 \cdot 10^{-4}$  Gm equivalents per L of solution.

The magnesium chloride formed in the reaction decreases the solubility of the cinnamic acid. The consequent reduction of the  $H^+$  concentration of the solution is offset by the hydrolyses of the  $Mg^{++}$  according to the equation



The degree of hydrolyses of  $MgCl_2$  at a dilution of 16 L per mol was determined at  $100^\circ C$  by Kullgren (15) as  $2.66 \cdot 10^{-3} \%$  per mol. Data for lower temperatures do not seem to have been published. As an approximation it may be assumed that the salting out effect of the  $MgCl_2$  is nearly compensated by its hydrolyses so that the  $H^+$  concentration of the solution at the end-point of the titration is about that of a saturated solution of HCIn. The indicator constant of methyl orange

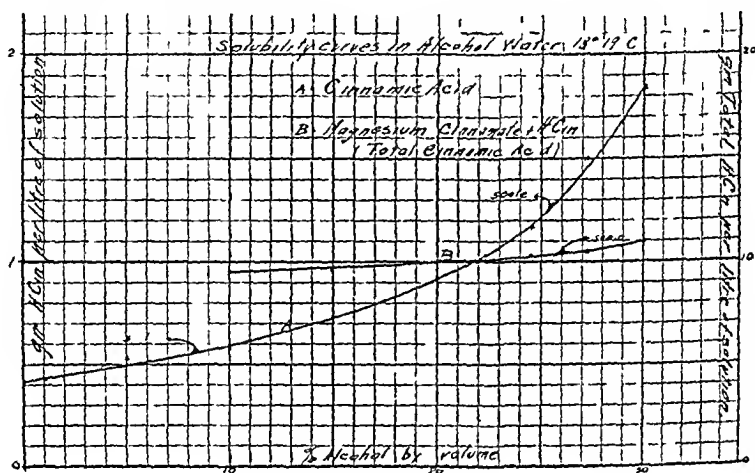


Fig 1

is  $5 \cdot 10^{-4}$ , consequently the  $H^+$  concentration of  $3.16 \cdot 10^{-4}$  is equivalent to 60% of a conversion of the color of methyl orange from yellow to red. To facilitate the detection of the end-point a color standard was prepared by dissolving a small quantity of cinnamic acid in alcohol adding the required amount of indicator and diluting to 50 cc with water. The separated HCIn adsorbs a large portion of the methyl orange necessitating the addition of a larger quantity of this indicator.

In the titrations 5- and 10-cc portions of the solutions were diluted to 50 cc and titrated with a  $0.1185N$  HCl solution. Each 5 cc required 2.6 cc of the acid which is equivalent to 12.03 Gm of  $MgC_2H_3O_2 \cdot 4H_2O$  per L of solution. This corresponds to 9.13 Gm of HCIn. The previously found value by the pyrophosphate method is 12.07 Gm  $MgC_2H_3O_2 \cdot 4H_2O$ .

The solubility of  $MgC_2H_3O_2$  and HCIn in the presence of each other in solutions containing 10% and more of alcohol by volume is practically identical to their individual solubility. The total HCIn content of such solutions may consequently be obtained by adding 9.13 Gm to the solubility values obtained for HCIn alone. This is shown in Table II and is also represented by Curve B.

From the foregoing it is now possible to calculate the maximum quantity of total HCm that may be present in the fluid tolu soluble of an alcohol content of 27% by volume. In the proportion of 1 part of the fluid to 20 parts of finished syrup, 50 cc are required to make 1 L of syrup. The total quantity of HCm that will dissolve in a L of solution containing 27% of alcohol is 10.6 Gm. Therefore, the maximum amount of total HCm in 50 cc of the fluid of tolu is 0.53 Gm. This is equivalent to a balsam of tolu containing 5.3% of free HCm. The fluid of tolu that was examined, however, did not contain  $\frac{1}{20}$  of the theoretical amount. Some of the fluids tolu listed in the catalogs of the manufacturers are directed to be mixed in the proportion of 1 to 12 give syrups that may contain more total HCm than the former, but, not to exceed 0.83 Gm per L of syrup. This, then, definitely establishes the fact that at their best the fluids tolu soluble designated to be used to make the official syrup are equivalent only to those made of the poorer grades of balsams of tolu. The one fluid of tolu investigated was nearly devoid of HCm and was practically only a flavored hydro-alcoholic solution.

The addition of water to a triturated mixture of tincture of tolu and magnesium carbonate precipitates the resins, esters and most of the acid. The resins and esters are adsorbed by the magnesium carbonate and the precipitated acid forming more or less perfect diffusion cells. The number of particles within the cells depends upon the number of all particles present and the degree of trituration. The distribution of the particles between the various cells will not be uniform, and if the ratio of the magnesium carbonate to the acid is large many cells will contain only particles of magnesium carbonate. Since each cell represents an individual reaction chamber much coloring substance will be dissolved before the reaction between the acid and carbonate is completed. If an inert adsorbent is substituted for part of the carbonate the time for the completion of the reaction between the carbonate and the acid is increased.

A more satisfactory procedure to practically eliminate the coloring substance is to substitute a solution of a neutral or nearly neutral reactant and an inert adsorbent for the magnesium carbonate. The most commonly accessible substances of this type are sodium bicarbonate and talcum. Sodium bicarbonate reacts with the HCm of the balsam of tolu to form sodium cinnamate. This was introduced to the medical profession under the name of "Hetol" and was used at one time in the treatment of tubercular infections. It is freely soluble in water and in alcohol-water solutions.

In their aqueous solutions both  $\text{NaHCO}_3$  and HCm are hydrolyzed and since the dissociation constant of carbonic acid  $\text{H}_2\text{CO}_3 \rightarrow \text{H}^+ + \text{HCO}_3^-$  is nearly  $\frac{1}{100}$  that of cinnamic acid, it follows that at the completion of the reaction between  $\text{NaHCO}_3$  and HCm the hydroxyl-ion concentration of the solution decreases to nearly  $\frac{1}{10}$  of its original value. When both the acid and salt are in solution the reaction is rapidly completed. This can be accomplished by adding only sufficient water to the tincture of tolu to precipitate the resin and esters. These are adsorbed by the talcum forming nearly neutral cells instead of the distinctly alkaline ones when magnesium carbonate is used. The reaction between the bicarbonate and the coloring substance is consequently reduced to a minimum, particularly if all the operations are rapidly completed. A slight excess over the theoretical amount of sodium bicarbonate is required to bring all of the cinnamic acid into solution.

This was found to be 5% giving a factor 0.6 so that the required sodium bicarbonate may be calculated by means of the formula  $x = 0.6a/10$ , where  $a$  is the percentage of cinnamic acid of the balsam of tolu

The suggested formula and procedure for syrup of tolu are

Tincture of tolu	50 cc
Talcum	50 Gm
Sodium bicarbonate	
Sugar	
Distilled water	q s 1000 cc

First prepare a well-wetted folded filter, next dissolve the sodium bicarbonate in 50 cc of distilled water calculated by the formula  $x = 0.6a$ , where  $a = \%$  of HCIn in the tincture of tolu. Triturate the talcum and tincture intimately, add 25 cc of water triturating until a smooth mixture is formed, now add at once the solution sodium bicarbonate followed while triturating by 250 cc of water, transfer to the filter. Wash the mortar with water and transfer to filter. When all has run through the filter add sufficient water to the filter to obtain 480 cc of filtrate. To this add the sugar and dissolve.

The filtrate has a faintly yellowish color yielding a nearly colorless syrup. It is slightly alkaline to litmus, gives a copious precipitate with HCl, a slight yellow color with alkali solution and a bluish color with methyl violet solution. The resulting syrup has a highly aromatic odor and taste and remains nearly colorless on keeping.

#### SUMMARY

Balsam of tolu contains a substance which is yellow in alkaline solutions and colorless in acid solutions. This coloring substance gives a bluish color to methyl violet solutions. It causes the darkening of the official syrup.

The fluids tolu soluble at their best are representative of the poorer grades of balsam of tolu. The one investigated proved to be a flavored alcohol-water solution.

The solubility of cinnamic acid and magnesium cinnamate in alcohol-water mixtures was determined with an accuracy sufficient for the purpose of this investigation.

A formula for syrup of tolu using sodium bicarbonate is given. It is finally suggested that a standard for the cinnamic acid content of balsam of tolu be adopted in the next revision of the Pharmacopœia.

#### REFERENCES

- (1) Tschirch, *Harz & Harzbehalter*
- (2) Vezes et Dupont, *Resines et terebinthènes*
- (3) K. Dieterich & Stock, *Analyse der Harze* (1930)
- (4) Hager, *Handbuch 'Ergänzungsband'*
- (5) E. Dieterich, 'Manual' (1910) 10th Edition
- (6) J. Mayer, *Zeitschrift fuer Electrochemie* 17 (1911), 978
- (7) Loevenharz, *Zeitschrift fuer Physik Chemie* 25 (1898) 394
- (8) E. Larsson, *Ibid*, 127 (1927) 244
- (9) W. Ostwald, *Ibid*, 3 (1889), 276
- (10) E. Larsson, *Zeitschrift fuer anorg Chemie* 155 (1926) 247
- (11) Beilstein, "Handbuch"
- (12) Tarugi and Checchi, *Gazzetta chimica italiana* 31, II (1901) 443
- (13) Ephraim & Pfister, *Helvetica Chimica Acta* 8 (1925), 375
- (14) Blasdale, *Quantitative Analysis*
- (15) Kullgren, *Zeitschrift fuer Physik Chemie* 85 (1913) 472

ADDRESS OF THE PRESIDENT OF THE AMERICAN  
PHARMACEUTICAL ASSOCIATION \*

BY W BRUCE PHILIP

To the Drug World I extend greetings as President of the AMERICAN PHARMACEUTICAL ASSOCIATION at the 51st annual meeting in this eventful year of 1933. While the AMERICAN PHARMACEUTICAL ASSOCIATION shares the field of pharmacy with many other organizations, it is parent of them all. The works of each organization are well known among you and speak for efficiency and value so that I need only claim your time to give reports of the important happenings of the past year that touch the centers of our organization's existence.

My acknowledgment to many willing workers, in and out of committees, who have assisted in the accomplishments of the year's work cannot be couched in phrases, my heart says them, but my pen fails to keep step with the beats of my heart, it dictates, however, that I may heartily and simply say, as President of the AMERICAN PHARMACEUTICAL ASSOCIATION, on behalf of the ASSOCIATION and myself—I thank you, one and all.

My experience in Washington fully convinces me that the AMERICAN PHARMACEUTICAL ASSOCIATION is more than fortunate in having its future headquarters in the Nation's Capital.

I have found, I say it after having watched numerous appointees, that a government official after a year or two of work in a bureau or department becomes fixed in his ideas, and prejudiced in his viewpoint, and more often than not, loses the broad understanding of the outer or business world. Herein lies a great danger and I want to impress upon you its importance, I may say the necessity for self-protection and of having representation near the governmental departments.

Only through persons with pharmacy backgrounds or representatives of an industry, who can have continual and frequent contact with governmental officials is it possible to keep viewpoints on pharmacy, and drug store problems unprejudicedly before them.

I repeat, constant contact is necessary, and vital.

## LEGISLATION

It must be remembered that now most of the new laws which limit and restrict pharmacy are having their origin in some government department, and that every month or two, sometimes weekly, yes, sometimes daily, government



W BRUCE PHILIP

---

\* Madison Wis August 30, 1933

offices, such as the Pure Food and Drug Administration, the Surgeon General's office, the State Department, the Treasury Department, the Narcotic Division of the Internal Revenue Bureau, the Bureau of Industrial Alcohol, and various Sales Tax Units are making new regulations which affect seriously our business

Every time the Government, through officials of a department, fails in a prosecution, there arises a desire in that department to change the law under which the case was tried and lost. The fact that proposed changes in the law might prove a great hardship is seldom considered. A slight change in wording of even a ruling provides loopholes for both convictions, and unhappily for technical violations which are embarrassing and expensive.

New laws, as framed by governmental departments, have two outstanding objectives

*First*, to give the Department more prosecuting force and *second*, to increase the scope of the work and likewise the budget allowance of the department.

Therefore, I affirm that it is extremely necessary to have a representative (available in Washington at all times), not only do I recommend it for our own pharmacy profession but also advise it for every industry.

This process of educating of our government officials and keeping them informed, may I assure you from first-hand experience, requires diplomacy, knowledge of all facts and a willingness to listen, and a patience that must be cultivated to the *nth* degree. Not only must the heads of all departments be seen and talked to, but many subordinates must be repeatedly visited. It is well known that political appointees are often not in a branch of industry for which they have had previous training, and therefore, in order that a whole governmental department may understand all sides of any question over which they hold jurisdiction constant watchfulness is necessary.

When an understanding is reached with a governmental official, when an official finds after repeated interviews that the representative and his association are asking for nothing unreasonable, a friend is often won for pharmacy that is valuable beyond belief when the reputation of a member hangs on solely the probability of facts difficult to prove.

Pharmacy has these friends in Washington and by fair dealing we will keep them.

In these interviews there is no place for threats of any kind, even the possibility of intimidation by suggesting the using of Congressional influence cannot be properly resorted to.

On the other hand, a firm stand on the fundamental principles of pharmacy must always be taken. The government officials must know the numbers and the resources of those in pharmacy. Your representatives, whoever they are, must know the power and strength of their organization and unhesitatingly let the facts be known. Respect for organization must be won for an association, before that association's voice will be listened to and its strength valued.

A governmental official, even in a minor office, feels his power and often he respects only organized force. I am willing to say that the average member hardly realizes the extent of respect given in Washington to National associations, and I want to urge upon you all the importance of keeping up the membership and forces of organizations. It is not by any means a wrong use of power, but in



competition with government bureaucracy must be strong to hold its own

And here comes one of the reasons why the new Pharmacy Headquarters Building in Washington will be morally one of untold benefits to the profession

#### THE AMERICAN INSTITUTE OF PHARMACY

There is a great deal to be said about the American Institute of Pharmacy, which is the official title of the lovely, marble palace which in the very near future will house the office staff of the AMERICAN PHARMACEUTICAL ASSOCIATION

It is ideally located in Washington on which is fated to become the best known street in the world, for when the programmed, expensive, grand and elaborate buildings that are at present being rapidly completed are finished on Constitution Avenue, no street elsewhere can compare with it, not in any city nor in any capital. If one were given a half a million dollars to-day he could not go out and buy a site equal to the one on which the monument to Pharmacy is located

For the benefit of those who have not the privilege of being acquainted with the City of Washington, let me pause and explain that originally the avenues were arranged to radiate from centers. One was from the Capitol, another important one from the White House. Time has made many changes in the city's plans and street traffic so that now the pivoting points are anything but convenient. Therefore, Constitution Avenue was selected as a solution. It has been developed as a wide straight thoroughfare, with a continuous row of new government buildings facing upon it. Our building has been strictly supervised by government agents, although privately owned. Last of these in point of position on Constitution Avenue is our own new marble palace, however its prominence is made more eminent by its very position, which is not the jumping off place, for rather it is at the turning place of travel, which leads to the nucleus of the whole designing and to the grandest of America's architectural achievements, the Lincoln Memorial.

From the steps of the building, as from the corner of a square one may look in two directions, at right angles, one to the other and see first the Lincoln Memorial in front, and then to one side along Constitution Avenue the Hall of Science Building and the massive governmental structures, while in the other direction, a stone's throw away runs the historic Potomac River. Where else could be found a more fitting place for our home. Upon these same steps will tread the feet of our pharmaceutical nation and the wise of our profession for many years to come.

In other parts of the program will be more detail descriptions of this masterpiece, nevertheless I cannot pass it without giving praise to some of those members of the ASSOCIATION who deserve our deepest gratitude for untiring work, as do Dr H A B Dunning, Dr Samuel Hilton and Dr E F Kelly. Almost unsurmountable obstacles have had to be overcome one by one.

I had the honor to be one of the speakers at the simple but appropriate ceremony on July 1, 1932, of the Ground Breaking Ceremony. Like several other presidents ahead of me, I had held hopes of dedicating the finished building to the glorious profession of pharmacy but that was not to be, as those guiding the destiny of this most important work have made haste but slowly. However, I plan to be present next year when it assuredly will be finished, for it is now fast reaching that state, and I am herewith inviting all of you to be there and to bring those with you who have the love of pharmacy warm in their hearts. It is not

too late for each of you to personally have a hand in furthering the project and to feel a part of it. I urge you to do your *utmost*.

#### THE CENTURY OF PROGRESS

Those of you who visit the Century of Progress will find in the Science Building in the Pharmacy booth on the first floor a miniature model of this future home of the AMERICAN PHARMACEUTICAL ASSOCIATION. In that booth you will find many things that show the progress that pharmacy has made in the last 100 years and you will find there Dr. H. C. Christensen, a recent past-president of this Association. He has assembled the Professional Exhibit for Pharmacy and has given time, work and money to furthering it. It is unfortunate that more money is needed to finance the actual care of it until the close of the Fair, and I am asking that every one of you send a donation to Mr. Julius Riemenschneider at 2500 Broadway, Chicago, Illinois. Send at least \$5.00—make it \$500.00 if you can, but send something.

#### PHARMACY WEEK

Pharmacy Week is a subject that deserves special consideration here in convention, and in the drug stores of our members, and the pharmacy colleges by the students, and in hospitals and wherever the art is practiced.

A good many of our pharmacists are taking Pharmacy Week for granted, or are leaving it to be taken care of by committee work, and are not backing it as a live opportunity to advance the better part of our industry.

The late Dr. Robert J. Ruth started a new epoch in Pharmaceutical History, and Dr. Anton Hogstead is ably carrying the work on, however, Pharmacy Week must have more universal support.

I could point my finger to dozens of drug store windows which during Pharmacy Week were decorated with cigarette cartons. Is there so much glory in smokes and so much profit in them that true pharmacy and valuable drugs are forgotten by druggists? It cheapens any drug store to utilize its windows for such displays, but more especially is it reprehensible during Pharmacy Week. Dr. Ruth saw with distress the cheapening of our window space and his endeavor was to bring up before the public a true picture of the advancement of the arts of pharmacy much as the Century of Progress Fair is doing in numerous ways, and so to advance the spirit of the attempt to better pharmacy I hereby appoint every pharmacist as a member of an auxiliary committee to help out in Pharmacy Week the Centralized Committee, and I ask President-Elect, Dr. Robert L. Swain, to reappoint these helpers.

With your permission I shall announce a name that I have coined for those drug stores in which there is no Pharmacy Week window from October 10th to 17th. They are "wazernots" and we of the profession are not proud of them.

#### UNIFICATION OF THE NATIONAL ASSOCIATIONS

Associated as I am at Washington with many representatives of organizations, I have been repeatedly asked why druggists have two national associations, the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists.

You perhaps know the answer, why there are two organizations but still that does not prevent the query voicing a live subject. The subject of the amalgamation of the two organizations, with preferably a central office in Washington deserves careful consideration. Not long ago one president of a State Association made the subject an issue in his presidential address. He argued that education, legislation and professional and commercial pharmacy might well be welded into one organization.

There are many members in both organizations who would favor a unification of the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists, their arguments are for more reasons than just for the saving of dollars and cents. I feel it incumbent upon me to report this very plausible union as it is reiterated in almost every governmental department that I visit. For my double position has taken me into all of these departments at some time as a representative of first one organization and then the other.

I have always looked at the two national organizations as though they were chums who were out to do a big needed task. Many times their paths have crossed though scarcely ever have they duplicated work and at all times where it has been advantageous for a common interest they have joined hands and forces and have battled a common enemy. It is to be hoped that no false love will ever take one from the other or that no siren will, by the magic of golden coin, lure either of them into a state of discord and trouble, nor spoil the harmony now existing between the two.

If a time ever comes, be it to-day, or next year or in the distant future, that the now separate organizations join and travel forward as one, I shall wish them well. Until that time arrives I trust that neither will leave the path of service and that they will each become strong mutually and fully understand each other.

#### PHARMACY AND DRUG STORE

The Drug industry is undoubtedly slated to accept many changes in the near future.

I believe that one of the most constructive steps in the furtherance of establishing the exact status of a drug store will arrive with a new definition of the words *drug store* and *pharmacy*.

With that end in view I offer as a constructive suggestion two definitions, which of course to be legal in the forty-eight states would have to be enacted into law in each of them.

A *Drug Store* is to be an establishment wherein less than fifty per cent of the stock, or in which the sales of less than fifty per cent of the items are public health service items. In such a *drug store* prescriptions will be neither received nor dispensed, although it shall be at all times under the direct supervision of a fully registered pharmacist. Only package medicines may be sold in such a drug store.

A *Pharmacy* is to be a professional establishment wherein over fifty per cent of the items in stock, and in which over fifty per cent of the sales made are of public health service items. A pharmacy shall be at all times under the direct supervision of a fully registered pharmacist, and in it only pharmacists shall have the right to compound and dispense prescriptions and medicines.

At the same time of designating drug stores from pharmacies or shortly after-

ward it will be possible to take one step further and say that *pharmacies* shall be *owned ONLY* by fully registered graduated pharmacists

This would supply an honest basis for a Pharmacy Ownership Law, and I dare to tell you, after years of study given to the subject, both from a legal and pharmaceutical viewpoint, that something of this kind will be the only basis upon which we can have our nation recognize the pharmacy ownership principle.

There are druggists who, in their stores, fill on an average only one prescription a day. They may put up a fight against such regulating, as a matter of fact, they are using the professional part of their stores, because of its very respectability, to encompass an unlimited field, which field should be narrowed down to stricter limits.

I have only to call to your attention the fact that the word *pharmacy* has never been applied promiscuously as the word drug store has, and that those merchandising establishments which have commercialized the profession, and which have in some instances gone as far as they could to wreck in the eyes of the world, and of every one who reads their advertisements, or sees their window displays, the high standing of the drug store, have only used and abused the word drug store. They do not *claim* to be a pharmacy. It is time that the profession takes cognizance of the aptness of the two terms.

I suggest that it is time that we in the profession of pharmacy let those who have cheapened and abused the name drug store take it. Let us reserve for Pharmacy a name that means skill, art, science, health, service, education and professionalism.

When, by law and regulation a strictly new meaning is put upon the word *pharmacy*, then and then only will such establishments measure up to the high standards of professionalism that are enjoyed by doctors and lawyers. Then will we have something for our college of pharmacy graduates to strive for.

#### PHARMACY AND THE NRA CODE

On July 27, 1933, the President of the United States, Franklin Delano Roosevelt, wrote into his Recovery Blanket Code in Section 4 of the National Recovery Act that the Labor laws did not apply "to registered pharmacists or other professional persons employed in this profession."

History was very definitely made in that sentence.

Are we going to entrench this position of the profession of pharmacy so that it can never be torn down? Are we not, as pharmacists, going to live and serve our communities as professionals?

The AMERICAN PHARMACEUTICAL ASSOCIATION has for eighty one years supported the profession of pharmacy and it still will continue to do so.

As modestly as I may, I shall tell you that I presented the cause of pharmacists, and that I asked that they be exempted from the so-called Blanket Code if and when it should be issued. Although I was discussing hours and wages I was acting at that time in my capacity as Counsel for the National Association of Retail Druggists, nevertheless, I was President of the AMERICAN PHARMACEUTICAL ASSOCIATION, and most vitally interested in the ethical and professional side. I am more than thankful that I had the opportunity to carry on the work of the worthy presidents who have gone before me. I know of no act in my pharmaceutical career that gives me greater satisfaction.

Because pharmacists sell merchandise, other than health items does not in any way prevent them from remaining or being still professional. It is rather accredited to their ability or education that often they are able to carry on the two lines of selling at the same time, provided, that they are practicing the profession of pharmacy as defined by the laws of the several states.

It is not unusual for strangers in towns and cities to go first to drug stores for articles. There is no hesitancy in entering any drug store, inasmuch as they are always classed as respectable establishments. To this extent the title Drug Store on a sign is an asset.

#### LIQUOR PRESCRIPTIONS

I, as your President, backed by the Council offer no apology for the stand taken by the AMERICAN PHARMACEUTICAL ASSOCIATION that beer has no place in a drug store.

It is not a question of morality, nor of personal privilege but that the past history of beer or the sale of it at retail is not one that fits in with the dignified practice of pharmacy.

If a saloon was to have put in a drug department we would be more than annoyed, then why should a drug store put in a saloon?

Respectfully I say beer is cheap, and that we are fast approaching a time when the drug store will lose its respect in the community and be judged by its cheapest product. Up to the present day the drug store has been judged on the merits of its most precious privilege—that of filling prescriptions and handling wares for the sick and injured.

If the privilege of filling of prescriptions is in any way taken from pharmacy little will be left to us. The licenses of pharmacists makes the privilege of filling prescriptions theirs and theirs alone.

Recently there have been repeated efforts made to have certain prescriptions for liquor filled at wineries and bonded warehouses or from stocks of liquors kept in other places than in drug stores.

Now it must be remembered that druggists did not ask for the privilege of filling liquor prescriptions, it was thrust upon them by the Administration, and the Prohibition Act, and its Enforcement, and now, after we have stood the abuse and ridicule of it, commercially minded interests are trying to switch it. As long as liquor is dispensed as medicine by physicians for the alleviation of pain and disease, the druggist should demand that they alone dispense it. When liquor is sold without a prescription then and not before will there be any right to place it elsewhere than in a drug store?

Pharmacists, be on your guard. See to it that the word prescription is not made a byword and in any way synonymous with a case of liquor, the purchasing of which is made by but forwarded from some warehouse to the home of a consumer.

Recently an effort was made to have the Attorney General of the United States modify his decisions so that a wine prescription could be filled at wineries and bonded warehouses if a registered pharmacist was employed there. A combined resistance was made by all officers of the AMERICAN PHARMACEUTICAL ASSOCIATION and by the National Association of Retail Druggists, and by many State

Pharmaceutical Associations, and a vigorous protest was registered against prescriptions being filled outside of the premises of a bonafide drug store

I am sorry to include so much concerning liquor in my address, but it is a force to be reckoned with at this time, and needs the very prominence that I am giving it

This month a plan was brought to my attention which proposes that drug stores have a cooperative liquor store house and that the retail druggist's permit be amended to include the address of the warehouse in it. Then when a prescription is to be filled for a *case* of wine or liquor, the pharmacist will phone to the cooperative liquor warehouse and have the liquor delivered to the consumer. This is still a danger—a danger even if a revised plan is substituted, whereby the liquor would be sent *via* the drug store to the consumer

#### NATIONAL FORMULARY AND UNITED STATES PHARMACOPŒIA

In the pharmaceutical world the five most important letters in the alphabet are National Formulary and United States Pharmacopœia. They stand as landmarks and as authority in our professional world.

Even though druggists have moved Salt-mouth and Tincture bottles from the front of their drug store to the back room, yet some cry their eyes out when a formula passes from the United States Pharmacopœia into the National Formulary. Nevertheless, it is in the scientific and pharmaceutical path of progress for the United States Pharmacopœia to become more and more a book of simples, and to define drugs and chemicals, and for the National Formulary to be a book of formulas.

It is the old graduates who suffer when a beloved formula is transferred. They love the old remedies, mixtures and concoctions, the very names of which are not even whispered to the on-coming generation of physicians.

There is a great justification in each revised form that the United States Pharmacopœia passes through. As always it is being compiled by the combined efforts of the government, medical scientists and pharmacists, all skilled in standardizing our newer medicines, and preparing them from crude drugs and chemicals.

It is well that the formulas for the centipede-like chemicals are passed to the National Formulary here to be revised by our own master pharmacist.

Those of you who are afraid that prescriptions will no longer be written for more than one ingredient have little to worry over, if prescriptions are written and pharmacy kept in its own channels.

In connection with the United States Pharmacopœia and National Formulary, I want to ask the deans of Pharmacy Colleges to give me undivided attention.

It is of utmost importance that every student know the National Formulary thoroughly. Each must know the formulas in it, and be able to bring them to the attention of the physicians who most frequently send prescriptions to a drug store in which he is employed. And do not let us cloud the art of the pharmacists, nor spoil the picture, by talking about cheapness or price.

Every student should know that the National Formulary is controlled by *pharmacists* and that it is made to serve physicians in the practice of medicine.

## CODE OF RETAIL DRUGGISTS UNDER THE NATIONAL RECOVERY ACT

Now rather far down in this address because in point of chronology it is so recent, comes my report of the happenings of the Code of Retail Druggists under the National Recovery Act, and of the position that the AMERICAN PHARMACEUTICAL ASSOCIATION has taken in this most far-reaching and unprecedented business upheaval. It is old news to say that the President of the United States dictated that each Industry should make a Code, and later declared that if an Industry did not respond and make a code, one would be made for it.

Pharmacy, as a two sided industry, has professional and commercial interests to look after. Indeed I must say that these are very much intertwined, and therefore a code satisfactory to every one presents a very complex situation. Modestly I say that it is providential that I, your President, am located in the Nation's Capital, and fortunate that the office of the Secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION is located in nearby Baltimore, and more than opportune that my successor, President-Elect, Robert L. Swain, is so close in Maryland. It is impossible for me to put into this address but few of the multiplicities of complications which have confronted Retail Druggists in preparing a code.

To sum them up briefly will be sufficient, for I fancy that before I shall read this address most of the difficulties will be surmounted and the results will be quite universally known. So far, and as a consequence of the combined efforts of druggists, in the furthering of their ever-ready health service to the Public, they have been successful in keeping professional pharmacy and pharmacists excluded from the Commercial Codes. While on the other hand the strictly commercial side of pharmacy has been incorporated in a code for the consideration of the President of the United States and his authorized agents in the endeavor to reestablish prosperity.

It is not likely that we will get all that we desire, nor that business conditions will seem ideal under it, but I do not hesitate to assume that very soon druggists will be able to adjust themselves to new conditions, whatever they turn out to be.

Strangely enough the Retail Druggists' Code has been framed to care for four classes of workers in drug stores:

- (1) The registered professional druggists who are excluded from it
- (2) Those working in drug stores and handling needed health service for the public over long periods of daily servitude
- (3) Delivery boys, engaged in delivering medicine
- (4) Those who must accept the same hours as workers under other codes in industries which parallel them

It is not possible to give at this time the ultimate hours and wages and conditions which will be allotted to each. When, during this code making, the AMERICAN PHARMACEUTICAL ASSOCIATION was called upon to help the National Association of Retail Druggists in solving code problems, it responded:

At no time has the AMERICAN PHARMACEUTICAL ASSOCIATION endeavored to usurp the field of the National Association of Retail Druggists in drafting the code. Opinions by officers of the AMERICAN PHARMACEUTICAL ASSOCIATION were freely given wherever it was thought they would be helpful. Your ASSOCIATION went

that far and no further What the future of Pharmacy will be under the final code approved by the Administration of the National Recovery Act is difficult to prophesy

As I said earlier in my address, it is fortunate your new home will be in Washington and that your next President lives nearby

The professional side of pharmacy under any code will be looked out for at all times by the AMERICAN PHARMACEUTICAL ASSOCIATION The National Association of Retail Druggists in attending to the adjustment code will be supported by the AMERICAN PHARMACEUTICAL ASSOCIATION when it needs help on any commercial or administrative problems

So that there can be not the least possible doubt about my position, my policies and my actions, I want to distinctly state that I have acted in three different capacities during these times of strife Sometimes it was as the President of the AMERICAN PHARMACEUTICAL ASSOCIATION, again it was as the attorney counsel for the National Association of Retail Druggists and at other times I was just W Bruce Philip, proprietor and part owner of a retail drug store, Philip & Philip, in Oakland, California

I have found it extremely difficult to divorce the person from the offices that I hold, in the minds of some prejudiced individuals, nevertheless I have expressed my honest opinion at all times, and I, for one have answered all questions that have been asked me, in my respective capacities I have not joined in any one of my three capacities, any drug organization wherein I would have to be bound with the by-laws which say, "every member must obey all rules made by a board of directors"

I have been criticized because I have not joined one of these, but I hold fast to the American principle that I have a right to stand on my own honest convictions, and I still consider it best to support the two great organizations which separately and together have long labored for the good of Retail Druggists When ever needed, the AMERICAN PHARMACEUTICAL ASSOCIATION has rallied to the support of the National Association of Retail Druggists and repeated by the National Association of Retail Druggists has espoused the ethics of the AMERICAN PHARMACEUTICAL ASSOCIATION It is fitting to say that with due regard for all this backing, I again reaffirm the stand that I took three years ago and again I say, "the Retail Druggist must look out for himself"

---

#### SALES IN A DRUG STORE

It is a new idea to me that restrictions on the use of alcohol can be blamed for what a C & D correspondent describes as the retrogressive nature of pharmacy and its degradation to mere shopkeeping, and I am disposed to think that he attaches an exaggerated importance to views expressed by earlier correspondents, who appear to me to be unduly pessimistic about the future of general pharmacy The practice of pharmacy is not a trade though associated in shops with the trading operations included in the business of a chemist and druggist As I conceive of the occupation which is properly described as pharmacy, it includes no sales or trading operations, so that it cannot possibly degenerate into mere shopkeeping or the sale of goods of one kind or another I have practised pharmacy and carried on business as a chemist and druggist in the same shop, but it never occurred to me when sales were brisk that I was being degraded as a pharmacist, or that there was anything retrogressive about what I was doing when handing goods over the counter and receiving payment —Xrayser in *Chemist and Druggist*, September 9 1933



## ADDRESS OF THE CHAIRMAN OF THE HOUSE OF DELEGATES

BY J W SLOCUM

*To the Members of the House of Delegates of the American Pharmaceutical Association*

To be elected Chairman of the House of Delegates is a distinct honor which I deeply appreciate. It came wholly as a surprise and unsolicited at the Toronto meeting last year. As your Chairman, I shall endeavor to decide impartially the will of the House.

Perhaps never in pharmaceutical history have there been so many intricate problems facing the members of our profession as exist to-day.

A speaker of 50 years ago might, honestly, have made a similar statement but that does not indicate it would not be more true several decades later. The years have brought new problems never even dreamed of a half century ago. The coined phrase "Profitless Prosperity" was not applicable to that day and age, it describes a frenzied, and almost fanatical theory of intensive merchandising which should have had little place in the practice of a profession such as ours. The race to make volume the greatest objective has caused men to lose sight of the true values, originally intended to be achieved. The founders of our profession fondly hoped that pharmaceutical service would always be considered of paramount importance, instead of being represented in the development of gigantic merchandising emporiums such as we have to-day.



J W SLOCUM

In spite of such developments, we are glad there are still men and women who honor the profession of their adoption and still adhere to the conviction that humanity will continue to appreciate the best of pharmaceutical service. For more than 80 years the AMERICAN PHARMACEUTICAL ASSOCIATION has promoted the highest principles of professional pharmacy and despite the tendency of the times, has engendered within its members a love and devotion that will never die. Much sacrifice has been necessary to bring this organization to where it stands to-day and those of us who are here, should not be slow to recognize the debt of gratitude we owe to those who made it possible.

As the years go by we become more appreciative of real values and we hope that, within this organization, our appreciation may be demonstrated by becoming more familiar with the precepts and principles for which it stands.

It frequently happens in large organizations that many of their members do not fully understand the functions of certain sections with which they should be familiar. That is doubtless true of this the parent organization of American Pharmacy.

With this idea in mind it occurred to me that a brief review of certain phases of our organization might be worth while, and especially that pertaining to the branch known as the House of Delegates. I take it that almost every branch of pharmacy in the United States is represented at this meeting. If they are not, we feel certain that they should be.

This should be a sort of home-coming for all members of the family. The leading officials of State associations are neglecting an opportunity if they do not attend the annual sessions of this great organization. I have been so impressed with the importance of this suggestion that last spring a letter was addressed to all State association presidents and secretaries suggesting that if Executive Committees had their attention directed to this matter and their cooperation solicited, something definite might be accomplished. Some State officials replied that they were already sending their leading officials to the AMERICAN PHARMACEUTICAL ASSOCIATION conventions, implying that they had long since recognized the importance of such a move. We are certainly glad that all associations were not delinquent in this matter, but hope the letter did reach certain states which gave some thought to the idea.

Attention was called to the fact that an ideal representative body could be assembled, if all State associations would act upon the suggestion.

To the president and secretary of State associations, their members look for a progressive program, and conventions such as this are intended to provide inspiration and stimulate creative effort. The House of Delegates is the legislative branch of the AMERICAN PHARMACEUTICAL ASSOCIATION. Among its many duties, it receives the reports of standing committees, elects and nominates certain officers, selects the place of meeting and prepares the resolutions for adoption.

It is composed of accredited delegates from State associations, the Conference of Pharmaceutical Association' Secretaries, the Conference of Pharmaceutical Law Enforcement Officials, the Plant Science Seminar, the National Association of Retail Druggists, National Wholesale Druggists' Association, American Association of Colleges of Pharmacy, National Association Boards of Pharmacy, American Drug Manufacturers' Association, the Proprietary Association, American Pharmaceutical Manufacturers' Association and Federal Wholesale Druggists' Association.

You will observe therefore that the By-Laws have provided for a thoroughly representative body including all branches of the drug industry.

It is obvious, then, that the State associations having a majority of the delegates of this body, if they have availed themselves of that privilege, are in a position of influence which should be used for strengthening their organizations. And, if strong State associations are built up, the result will be reflected in a stronger parent association.

Constant contact with such institutions as this can only result in greater enthusiasm for the betterment of pharmacy and that, primarily, is the only excuse for its existence.

Upon the Chairman of the House of Delegates devolves the duty of appointing a nomination committee of nine members whose duty it shall be to nominate the candidates for the offices of President, First and Second Vice-President, and the candidates for membership in the Council. This Committee shall also nominate the Chairman and the Vice-Chairman of the House of Delegates.

At the final session of this body the Chairman shall appoint a committee of five members on Place of Meeting and this committee shall report at the second session of the next annual convention. Among the most important committees of such an organization as this, is the Resolutions Committee, and upon the House of Delegates is placed the responsibility of its appointment. To this committee the address of the president of the ASSOCIATION is referred.

Even a proposed amendment to the By-Laws must be submitted in writing at one session of the House of Delegates and such resolution may be acted upon at the next session.

Your Chairman calls your attention to these provisions of the By-Laws, not because of anything new concerning them, but rather to place the proper emphasis upon the important responsibilities which are yours as delegates to this most honorable body.

One of my predecessors took occasion, a few years ago, to say that "The House of Delegates is the foremost body that can at this time be brought together representing pharmacy in all of its many, many phases."

Now, all this would appear to be more or less of a eulogy but to say the least, it is not a eulogy over the remains of the departed. The body is still intact and functioning in the best of health. Rather, we have tried to make you proud of the institution of which you are members. When the realization of our importance is brought home to us, our loyalty is assured. If we make use of the organizational facilities we now have, we shall make definite progress.

In recent months, much has been said and done to detract from serious thought along the lines of professional service. The National Industrial Recovery Act and the adoption of codes of fair competition have occupied our almost undivided attention.

Many stores are greatly concerned as to whether they will be able to survive or not, and it is to be hoped that the recovery steps taken will prove to be a panacea for their ills. Stabilization and maintenance of resale prices are possible attainments of the recovery act and this to my mind is the most encouraging feature possible of achievement.

The Century of Progress has given our profession an unusual opportunity to impress the world with its real importance. Those who assumed charge of the Century of Progress Exhibit have very successfully depicted the growth and development of Pharmaceutical Education and legislation for the past one hundred years. It is worthy of note, that the height of interest to the public is the semi-circular prescription compounding case, where pharmacists are daily performing many duties of their profession in full view of the public.

It is more than passing strange that in a gigantic exposition, where there is so much to attract the attention, that the simple compounding of medicines should receive more than a hurried glance.

The display of the famous Ebers Papyrus, the earliest known book of remedies, in contrast with the United States Pharmacopœia and National Formulary of the present day is a very unique educational exhibit. The romantic story of drug discovery and development bears an interest to the laymen as well as to the chemist, the pharmacist and the medical practitioner.

The culmination of the hopes and ambitions of many, a home for American

Pharmacy, is about to be realized in the completion of the Pharmacy Building in Washington. This is an outstanding achievement in the annals of pharmaceutical history and will, doubtless, impress the people of the world as no other single event has ever done. And so our profession has kept in step with the progress of the century just passed. We are justly proud of its accomplishments.

In the past few years we have been passing through trying times. It is difficult under circumstances such as these to undertake and promote new projects. But now that the tide is turning, it is highly probable that new projects will receive more encouragement.

From an economic standpoint, many things have been discouraging from the retailers' point of view. Much has been said about the dispensing of medicines by practicing physicians, and some have indicated that this condition was improving, but when you survey the situation in the various districts of most any state, you will still find this most serious complaint among retail druggists.

Our schools of medicine are doing little to alleviate this condition. Not long since I had a conversation with a school official of a large university, and he told of an interview with a medical student. The student indicated that prescription writing was taught only half-heartedly and said that a large majority of a graduating class made the assertion that they intended to dispense their own medicines. What other result could be expected when they were not encouraged to write prescriptions?

It occurs to me that here is a field for fruitful study and investigation by the AMERICAN PHARMACEUTICAL ASSOCIATION, which might prove of great value to the retail drug industry.

There may never come a time when all the evils to which we are heir will be corrected, but a program of constructive effort along these lines would be welcomed throughout the entire country.

There never was a time when it was so necessary to present a solid front and march in unison as it is to-day. Petty jealousies should be eliminated and sectional prejudices forgotten. If we are to win in the struggle to bring pharmacy back to a firm foundation, it will take all the unified forces and dominant courage we are able to muster. But with the best brains of the industry working together in a common cause we shall prevail.

The Gravimetric and Volumetric Determination of Brucine and Strychnine as Dichromate," by I. M. Kolthoff.—Brucine salts yield a precipitate with potassium dichromate which after drying over deliquescent sodium bromide, has the composition  $(C_{15}H_{16}N_2O_4)_2 \cdot H_2Cr_2O_7 \cdot 5H_2O$ . Strychnine dichromate prepared under the same conditions has the composition  $(C_{21}H_{22}N_4O_6)_2 \cdot H_2Cr_2O_7 \cdot 5H_2O$ . Gravimetric and volumetric procedures are described for the quantitative determination of brucine and strychnine as dichromates.

The Determination of Strychnine and Brucine as Hydroferrocyanides and Their Separation by Means of Ferrocyamide" by I. M. Kolthoff.—The sensitivity of the precipitation of strychnine and brucine in hydrochloric acid medium with hydroferrocyanide has been determined.

Strychnine can be determined with great accuracy by precipitation as hydroferrocyanide. The precipitate is weighed in the air in dry form. The method yields quantitative results even at great dilution. The determination of brucine is less accurate owing to the greater solubility of its hydroferrocyanide. A simple method is described for the quantitative determination of strychnine in the presence of brucine. It is based on the fact that the hydroferrocyanide of strychnine is less soluble and is formed more rapidly than that of brucine.—<sup>1</sup> Scientific Section, A. P. U. A.

## ADDRESS OF THE PRESIDENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

BY CHARLES H STOCKING

Under Canadian skies, at the last Annual Meeting of this Association, and, incidentally, in the year which marked the One Hundredth Anniversary of the birth of its first president, the American Association of Colleges of Pharmacy very graciously bestowed upon the speaker the highest honor at its command

The privilege of serving as your president has been a most pleasant and worthwhile task and one that has contributed much of value to my fund of information concerning the specific functions of this organization For your confidence in me, and for your excellent cooperative assistance during the year, I wish to express to you my sincere thanks and deep appreciation If in any measure of your estimate of my ability I have served the Association acceptably as its executive officer, I am glad

The year 1932-1933 is historical for pharmaceutical education in America because it is the doorway through which all member colleges of the Association have entered into the realm of the minimum four-year curriculum For a number of institutions, the four-year requirement for graduation is not an experiment of recent origin Such a practice, either as the sole method open to matriculants, or as an optional plan, has been in effect in several of the member colleges for a number of years Other colleges have made this adjustment only with the beginning of the collegiate year just closed Probably, in certain respects, no less auspicious time could have been selected College and university budgets have been drastically reduced, making it difficult in many instances to expand the faculties and to purchase needed equipment Many young men and women have been hampered and even blocked in their attempts to secure an education in pharmacy In spite of the great increase in the number of graduates from the high schools of the nation, college attendance has declined in many localities, not because of the lack of thirst for knowledge on the part of the youth of the land, but because brains cannot be fed unless the body can be nourished, and the body cannot be nourished on an income reduced to the vanishing point However, in the face of these handicaps, namely, reduced collegiate budgets and reduced student budgets, the first year of the Association under the minimum four-year curriculum requirement has drawn to a successful close Some of the member colleges have even reported an increase in attendance The number that have been operating under discouraging conditions has been exceedingly small Actually, very few of the colleges have found the beginning of the road really rugged under the "new deal," and it is to be expected



CHARLES H STOCKING

that the way will be smoothed out for them as time progresses. Therefore, it is worthy of note that such remarkable progress has been made in pharmaceutical education in America in the past decade in building the foundation for the standard college curriculum in pharmacy, and in inaugurating that curriculum into actuality in a year filled with difficulties financial in character for faculties and students alike.

With Dean Leigh, my immediate predecessor in office, I agree that considerable time should elapse before we vote to extend the graduation requirement beyond the four-year limit under which we are now operating. We are all grateful, I am sure, for the advance that has been made and it is evident that we must remain steadfast in the accomplishments of the past years, "holding fast that which is good." No attempt of a retroactive character can be tolerated. On the other hand, in the words of our immediate past-president, "Let us first obtain a firm footing on the prescribed four-year course before we proceed to ascend, which on being interpreted into plain language means that we should first translate our new requirements from paper to almost perfect performance before discussing seriously the question of the inauguration of a two- or three-year pre-pharmacy course, or of recommending that state boards demand that candidates for registration hold at least the Master's degree before being admitted to examination." This, I think all of us will agree, is sound advice. The giraffe *having* acquired its long neck by reaching up for its pabulum has perhaps reached high enough for the present and should proceed to digest and elaborate the pabulum of which it has just come into possession. Let the content of the four-year curriculum and the method of its presentation to students of pharmacy be studied very carefully. Let us even teach English in the *fourth* year instead of in the first year if that would seem to be the thing to do. Let us look to the true cultural training of the future pharmacists without encroaching upon the fundamental fields of pharmacy, chemistry, pharmacognosy, pharmacology and other scientific subjects by so doing. Let us increase our library facilities and teach our students the true worth of books of reference and let us teach them how best to use these books in order to make of them real tools of service. Let us emphasize more than ever before, the necessity of a close acquaintance with the current scientific literature of the time. Let us as teachers instil into the minds of our students a love and respect, not alone for the ancient and honorable profession of pharmacy, but also for a modernized pharmacy, in order that they may revere and learn to practice its Code of Ethics and to stand at all times as proud representatives of the pharmaceutical branch of that large and vastly important group of public servants known popularly as the health professions.

Standards we may have, but standards without a spirit are but dumb creatures indeed. Too long has pharmacy occupied a subservient place in the minds of its devotees. Too long has it carried on its duties to the public in a mechanical, faithless sort of way. Only through the inspiration emanating from the educational group, with the manifold opportunities at its command, can the next generation of pharmacists enter into possession of the proper professional esprit. As members of the various faculties constituting this Association I believe it is our solemn duty to examine ourselves and to so catch the gleam of the ideal toward which we would direct our students that we lose sight for the time being of so many of those things

that have occupied our discussions in recent years, and devote our undivided attention to means and methods of enriching the courses which we are now teaching, vitalizing these courses, not only with new facts where needed, but with facts so presented that they will draw from the students that quickened interest which prompts the thirst for a broader and deeper knowledge of the subject at hand

It is told of the great Agassiz that he was presented one day with a check for \$1000 and invited to use it to defray the expenses of a trip to Europe. The scholar replied that he was too busy to go to Europe, that the journey was too confined, and because he wished to travel over vaster regions, he proposed to spend the summer in his own back yard. That yard was scarcely more than a few rods square, but Agassiz traveled over it very carefully. In one corner of the yard he found a small stone that held the outline of a mollusk. Nearby was another pebble holding the impression of a broken fern, while other stones were found each of which held its own image and superscription. Three months from the time he started, the scientist reached the other end of his lot. He made a carefully prepared record of his observations and experiences and published them under the title, "The Journeys of a Zoologist."

The moral of this tale is obvious. Each individual here and each organized unit—school, college, department—has a back yard that will stand examination. Out of the dust of the commonplace can come the knowledge of the centuries and prophecies for the future. Careful examination of internal conditions often reveals faults and imperfections that demand correction. If any faculty member is not living up to the standards that should be set to guide him in his work, he should be the first to discover the fact, and the first to bring into play the necessary corrective measures. If any college of Pharmacy is knowingly deviating from the qualifications established by this Association for membership therein, steps should be taken at once to bring into line every phase of its activities in order that no criticism can obtain either from within or without.

We are convening for this, the thirty-fourth annual meeting of the American Association of Colleges of Pharmacy, in the environs of a great university whose Course in Pharmacy is celebrating this year the Fiftieth Anniversary of its founding. To have survived a half century means little, but to have been known for that period of time as a leading institution of learning and promoter of scientific research is a notable achievement. The faculty here has given to the students who have come to them that vision of the true spirit of learning which is so essential to the art of becoming really educated. As the result of this vital, dynamic force activating the minds of the students in this historic institution, the status of pharmacy in Wisconsin and throughout the nation has been appreciably advanced. From the pharmaceutical research laboratories of this university have come scores of scientific publications to enrich the fund of knowledge concerning pharmacy in its many branches. Graduates from its halls have gone out to inspire countless others to a true appreciation of pharmacy as a life work.

To Dr. Frederick B. Power, who was the first Director and who for a period of nine years served on the pharmacy faculty of this university, and to Dr. Edward Kremers, his successor, who has devoted forty-one years of his life to teaching and research here, great credit is due. The record of achievement that has been established in teaching and in research in the Course in Pharmacy in the University of

Wisconsin is worthy of emulation by those colleges of pharmacy that have been less aggressive along similar lines

I feel that it would be but a meager tribute on our part if we were to adopt at this convention a resolution extending to Doctor Kremers, the Director of the Course in Pharmacy of the University of Wisconsin, and to his staff, our heartiest congratulations on the remarkable record of the first half-century of the institution, and expressing our faith and confidence in the future developments of pharmaceutical education in Wisconsin as exemplified by the results of the last fifty years

While the University of Wisconsin is commemorating the Fiftieth Anniversary of the teaching of pharmacy within its halls of learning, the nation is celebrating, in nearby Chicago, A Century of Progress. Among the exhibits that have been prepared to portray the vast changes that have been wrought by the hand of time, visitors to the Exposition are reminded that the last ten decades have brought evolutionary developments, scientific and commercial, to our own time-honored profession. Emphasis is placed upon the United States Pharmacopœia and its companion work, the National Formulary, and the part they play in providing the physician and the pharmacist with formulas and materials for combating disease and preventing its occurrence. Chemistry and its application to the various problems having to do with the health of the public is brought into the limelight. The spirit of science and of education is being immortalized in the minds of all who view the marvelous exhibits. He is daring, indeed, who would attempt to visualize a Century of Progress Exposition one hundred years hence. My only message in that regard is one of hope and admonition that we as progenitors of the pharmacy of the future may leave a heritage that will do credit to the enlightened vision that has been given to us. May this Association be the Arcturus that shall light the pathway of the colleges of pharmacy a century in the future!

That conditions within the Association are constantly passing through an evolutionary process tending toward improved standards is self-evident. A perusal of the catalogs of the member colleges shows an increasing number of the younger faculty members with graduate degrees. The subject of qualifications of faculty members has been discussed on numerous occasions before this body and I feel justified in saying that it is evident that candidates for teaching positions in colleges of pharmacy realize more than ever before the necessity of graduate work as a prerequisite to employment. Furthermore, there is a distinct movement on the part of faculty members to-day to expand their professional training by enrolling in the graduate schools of the various universities in this and other countries for the purpose of specialization along scientific lines. The urge that has been given to this movement in the past is without doubt bearing fruit.

Other evidences of improvement within the colleges are perceivable as one views conditions at the present time in many of the member colleges and compares them with conditions that existed a few years ago. Beginning with the year 1927-1928, the regular triennial visitation trips to member colleges have been made. In most instances I am sure that the institutions visited have been helped in one way or another. No soiled linen has been washed in public, and perhaps not enough laundering has yet been done, but I believe the ultimate results have been worth far more than the cost. One very excellent result has been the amalgamation of the colleges into a closer union through the interchange of ideas and



friendly criticisms between faculty members of the visited institutions and the visitor from another institution I would urge that the visitation program be continued

During the year just drawing to a close, the American Council on Pharmaceutical Education has been organized with three members from this Association, three from the AMERICAN PHARMACEUTICAL ASSOCIATION, three from the National Association of Boards of Pharmacy, and one, an advisory member, from the American Council on Education

I have been informed by Dean DuMez, Secretary of the Council, that the work that has been done up to the present time has been of a preliminary nature in so far as the organization of the Council is concerned Dr Robertson, the representative of the American Council on Education, was not appointed to the Council on Pharmaceutical Education until early in the present calendar year The formation of the group was, therefore, not complete until that time It then developed that Dr Robertson felt very strongly that it would be advisable to attempt to secure the cooperation of the colleges outside of the American Association of Colleges of Pharmacy before the work is actually started Furthermore, it was agreed that the representative of the American Council on Education should make this attempt These preliminary steps have required time, so much time in fact that the Council has not been able to begin the actual work of outlining its program previous to this meeting Dr Robertson expected to be present in Madison to address the Association but found it impossible to do so as he was compelled to go to Europe and will not return until some time in September

The Fourth Edition of the Pharmaceutical Syllabus which has come from the press since our last meeting is a credit to the Committee which directed the work of preparing it, and especially to Dean J G Beard, the Chairman of the Committee I feel that this Association as a contributing member of the joint Committee should express to Dean Beard its deep appreciation for the untiring effort which he put forth to bring to completion in such a satisfactory manner the work of preparing and publishing the Syllabus, *and I so recommend*

Two states, namely, Georgia and Wyoming, have enacted laws during the past year raising their standards to college graduation as a prerequisite for registration in pharmacy Attempts to secure prerequisite legislation in some of the other states were also made, but without success I regret to report that in Michigan, my own native state, legislative efforts intended to demand in the near future college graduation as a qualification of all candidates for registration met with defeat in the Senate after receiving favorable consideration in the lower branch of the legislature It is to be hoped that this condition will soon be corrected, not only in Michigan, but in the other states that are now operating on the lower requirement basis The great states of Massachusetts and Tennessee, as well as several states in which no colleges of pharmacy exist, are operating without the educational requirement Early in the present year a graduate of the College of Pharmacy of the University of Michigan wrote to Secretary C C Glover as follows

Will you please fill out the enclosed College Certificate Blank for the Illinois Board of Pharmacy and return same to me? I applied for registration here in Illinois by reciprocity on my Michigan Registered Pharmacist's License, but was refused because I wrote and passed the Michigan Board of Pharmacy Examination prior to graduation from the University'

These two sentences paint a picture which typifies the experiences of countless other candidates who attempt to reciprocate from states operating on the lower requirement basis for registration to those states which demand college graduation as a prerequisite. This young man graduated from the four-year curriculum of the College of Pharmacy of the University of Michigan in June 1927. A year or two previous to graduation he saw fit for one reason or another to write the Board Examination. He was successful. Seven or eight years later he found it necessary to become registered in Illinois, and because the Michigan law did not prohibit him from applying for the privilege of registration previous to graduation, he was rightfully denied the privilege of reciprocity.

Under date of July 24, 1933, the following letter was written to me by a practicing physician in California:

'I wish to call your attention to a great abuse on the pharmacy profession in California. For a number of years any person who had worked three years in some pharmacy and had memorized the answers to certain sets of questions as usually given at the Examination of the Board of Pharmacy of California was allowed to go before this Board, and, if able to answer 75% of the questions, was given a license to function as a druggist!!! Just imagine allowing such ignorant persons to be given a license and with no training in a school of pharmacy!!! I have met a number of such unprepared druggists, some of whom seem to be worthy of the designation 'moron'.

The general public knows nothing about the humbug, and the 'druggist (!!!) fills the prescriptions the best he can!!! I understand that the state of Arizona allows such non graduates to attempt to 'pass the Arizona Board Examination.

Is there no way to prevent such untrained men from functioning as druggists when we know that hundreds of well trained graduates in pharmacy are walking the streets looking for positions? Here in Santa Rosa we are filled up with such non graduates. Five minutes' conversation with any of them will convince you in regard to what to do with them. Please help to correct the abuse.'

While his information isn't quite up-to-date in so far as the California requirements are concerned, his sentiments are rather forcibly expressed. The very fact that the educational requirements for registration in California and in some of the other states are low, introduces a problem of serious consequence to the colleges of pharmacy located in those states. In order to extend the benefits of reciprocity to all registrants, and to raise the status of the profession of pharmacy to a plane that shall remove it from the unfavorable criticism of the members of the medical profession, and to give every pharmacist in every state the high regard that he should hold for himself and for his fellow pharmacists, state boards of pharmacy and college of pharmacy authorities in all states that are not now requiring graduation as a prerequisite to registration must work together to bring about the necessary legislative changes at the earliest possible date.

I wonder how many of you have read the article in last month's *Outlook*, by Dr. Harold Rypins, Secretary of the New York State Board of Medical Examiners, under the caption, "Toward Professional Guilds." He says in part,

The United States has more physicians per unit of population than any other country in the world. With a total of 156,440 licensed physicians at the present time, we have one for every 780 persons. England has one doctor per 1490 persons, France one per 1690. Sweden one per 2890. The Commission on Medical Education estimates that a reasonably complete medical care can be provided in the United States on the basis of one physician to about 1200 persons. That an adequate medical service for the country could probably be provided by about 120,000

active physicians' According to these figures we have a surplus of approximately 36 000 physicians

'This town is damnably over lawyered, what we need is fewer and better lawyers,' declares a *New York Times* editorial The census of 1930 reports 160 600 lawyers in the United States an increase in one decade of thirty one per cent—almost double the rate at which population increased One law school in a large eastern city, by dint of jamming crowds into a small building, made a fortune on a small investment There were as many as 500 students in one room, and the course was aimed not at a high standard legal training, but straight at the bar examination

The over production of architects is manifest in the report of the Architects' Emergency Committee of New York in 1931 which states that of the 800 architectural draftsmen who were unemployed 500 were destitute There are 3358 architects registered in New York

'We have approximately 100 000 pharmacists in the United States On a population basis, they operate six times as many drug stores as are found necessary in Germany, which has well organized apothecary shops

This year there are 243,830 graduate registered nurses in the country In some sections it is said that there are ten nurses for every job and a fearful struggle for existence is going on in this hopelessly over-crowded field

Concerning teachers the Biennial Survey of Education reveals that more than 3000 graduates of New York City training schools were qualified for positions in 1930 whereas less than one-third of them could be actually placed on the eligible list Throughout the nation there are approximately one million teachers About 166 000 are needed annually to take the places of teachers leaving the profession Yet as long ago as 1928 there were 274 348 students in training What is happening to the enormous surplus of trained teachers? Look behind the counters in the larger metropolitan department stores It would be interesting to know what percentage of sales girls in these stores are teachers awaiting appointment and how many years they have been waiting

Of dentists the nation has 67,000 In certain urban districts, there is one dentist to every 500 people

'The effects of over production in the professions, besides unemployment and excessive economic competition are manifold 'An over supply of any branch of learning,' declares Dean Rogers of the University of Colorado College of Law, usually results in the development of price cutting irregular trade practices and a fringe of casualties, losses and waste at the unsuccessful margin There will be the temptation to low ethical standards produced by desperation The public in the end will suffer, as the individual does, from the existence of misfits, failures wasted energies and frustrated efforts' In the profession of medicine over crowding has increased fee splitting, unnecessary services padding of bills illegal operations and the employment of runners' The compensation rackets have developed to such an extent that physicians are reported to be giving half and sometimes two thirds of their fees to get this business Corrupt conditions such as these will not encourage students of superior ability and character to enter the profession In law, Philip J Wickser Secretary of the New York Board of Law Examiners declares, there is a dim consciousness that the bar is surely and not so slowly, being de professionalized For this there are many reasons each of which is aggravated by the undeniable factor of volume'

These enormous surpluses make it obvious that admission to the profession must be restricted

'Criticism of the aristocracy or 'guild idea' in the profession is inevitable Loudest will be the cry that a trust or monopoly, may be created As a matter of fact the practice of medicine is already a monopoly in the sense that the source of supply of physicians is restricted to those institutions which are recognized by the state for the purposes of medical licensure The intent of this monopoly is not to create benefits for the medical profession but to protect the public Moreover the special position in society of the doctor, the lawyer the nurse, the teacher, in itself makes the 'trust inevitable

There is still the democratic fallacy to be disposed of The irate father of an unsuccessful applicant to a medical school recently voiced the feeling of many in similar circumstances Every American boy who wants to enter a profession' he said, is entitled to have a try at it' Should a monopoly, then bar a large number of young men from their inalienable right to become physi-

cians, engineers or dentists? Would not many competent men be kept out of the professions? To this one may say that taken by and large, the real danger is of loosing incompetent men upon the public by unrestricted training and licensure

"It becomes clear that because of lack of planning and foresight we have trained professional men and women without any consideration of possible consumer requirements. Even where there has been some restriction through insistence upon high educational standards, no one appears seriously to have contemplated refusing permission to open new professional schools on the grounds that there was no need for them

"Professions are just beginning to realize that it would be very desirable to train and license only as many architects, nurses, lawyers, teachers, physicians, pharmacists or engineers as the country can employ. As this idea gains wider acceptance it seems inevitable that an aristocracy of professional classes will arise. The selection of a limited number of candidates for each profession will, for the most part, rest with the professional schools themselves, under the direction of the state licensing authorities. Both the public and the medical profession have already profited by partial restrictions in this field. Dentistry and law are passing through the stages of limitation by increased educational standards which medicine has inaugurated during the past twenty years. A much shorter period will elapse before engineering, architecture, nursing, teaching and the other professions take similar steps toward professional guilds

The effect will be revolutionary.

Are we in pharmacy moving toward the professional guild idea? Is this our aim and objective? If so, are we moving rapidly enough? Are we interested in mass production, or in quality within restricted numerical limits? The problem of supplying the demand for graduates without overstocking the market is not one for the colleges alone to solve, but is far more complicated. The cooperation of Boards of Pharmacy and trained pharmacists in every commonwealth must be solicited in order that a unity of effort may be put forth to bring into being the needed changes, legal and otherwise

Boards of trustees and other bodies who have charge of the financial affairs of the various colleges of pharmacy must be appealed to in no uncertain terms in order that they may realize to the fullest extent the necessity of providing funds adequate to present-day needs. Further financial retrenchment cannot continue without hampering seriously the progress that is being made

In the thirty-three years of its existence, this Association has had a record of achievement of which it can well be proud. In conjunction with its cooperating organization, the National Association of Boards of Pharmacy, by means of the joint sessions and the District Meetings, many important developments have been made for the benefit of the public and the profession itself. I predict that its future will reveal a record none the less glowing in its accomplishments

---

"Tincture of Stramonium Seed Free from 'Plant Dirt,'" by Ralph Clark and Edward Kremers.—Though richer in alkaloidal content than the leaf, stramonium seed has been replaced almost entirely by the leaf in the making of galenicals. This has been due, in large part, to the high percentage of fatty oil in the seed. True the seed can be deprived of its fatty oil content before percolation with an alcoholic menstruum, but, even if this precaution be taken, the finished preparation will be highly colored because of the dark pigment in the seed coat. No doubt there are other disturbing factors. Much, if not all of this "plant dirt" as Lloyd calls it, can be eliminated by mixing the ground seed with freshly slaked lime before extracting it with alcohol in the percolator. The pigment is altered so as to be rendered insoluble. What other changes take place has not yet been ascertained. For this first experiment a defatted seed has been employed

<sup>1</sup> Abstract of a paper—Scientific Section A. PH. A.

ADDRESS OF THE PRESIDENT OF THE NATIONAL ASSOCIATION OF  
BOARDS OF PHARMACY \*

BY CLARE F. ALLAN

*Mr. Chairman, Members of the National Association of Boards of Pharmacy and Guests*

It is indeed an honor as well as a privilege to greet you to this, the thirtieth annual meeting of the Association.

We are very fortunate to be able to hold our meeting in the city of Madison, which for nearly a hundred years has been the center of educational as well as political activities in the state of Wisconsin. Madison, with its beautiful University and Capitol buildings surrounding the shores of its several lakes, gives to us an inspiration which cannot help but make this convention a success. Not only has the State of Wisconsin contributed greatly to the success of the country through its various industries and agricultural interests, but it has also contributed a number of recognized leaders in pharmacy. I am certain that we are going to gain a great deal of good from an educational standpoint as well as one of pleasure from this meeting.

## ASSOCIATION AFFAIRS



CLARE F. ALLAN

In the discussion of the Association's affairs, I shall endeavor to be as brief as possible but at the same time give you a summary of the year's operations without going into any lengthy statistics. The detailed statements will, of course, be given in the Executive Committee report and those of the treasurer and the secretary. Nevertheless, I want the members of the Association to be conversant with some of the facts pertaining to the operation of the Association.

Our cash balance at the beginning of the year was eight thousand four hundred ninety-five dollars and seventy-eight cents (\$8495 78) some of which was invested in government bonds. At the close of the fiscal year, five thousand five hundred seventy-five dollars and sixty-seven cents (\$5575 67) or a decrease of two thousand nine hundred twenty dollars and eleven cents (\$2920 11). The decrease in net worth was two thousand, seven hundred ninety-four dollars and fifty-six cents (\$2794 56), not quite so much, as some of the items were of a permanent character, not merely expense. While the Executive Committee authorized a budget of seventeen thousand, three hundred twenty dollars (\$17,320 00), the actual amount spent was only fourteen thousand, nine hundred thirty-three dollars and four cents (\$14,933 04). The secretary cut every possible item and thus effected a

---

\*Madison Wis

saving amounting to two thousand, three hundred eighty-six dollars and ninety six cents (\$2386 96) Also the office staff was reduced by one in January and the rental of the offices was cut fifty dollars (\$50 00) per month beginning in May and thereafter

By way of comparison We had a cash decrease for the fiscal year ending June 30, 1932, of three thousand one hundred forty-three dollars and nineteen cents (\$3143 19), also our income during that year was seventeen thousand six hundred forty-six dollars and twenty cents (\$17,646 20) whereas our income this year was only twelve thousand, five hundred seventy-six dollars and three cents (\$12,576 03), a slump of over five thousand dollars (\$5000 00)

Our income for the year ending June 30, 1931 was twenty-three thousand, fifty-three dollars and ten cents (\$23,053 10)—about normal Our cash disbursed that year was approximately twenty-four thousand, two dollars and ninety four cents (\$24,002 94) Thus it will be seen that although our income during this past year was only about half that of 1931, our expenses have been pared down in almost the same proportions

The officers of your Association have in every way endeavored to operate the National Office as economically as possible through this, the worst year of the present depression

#### RECIPROCITY

The applications for reciprocity in the past year have been at very low ebb Those who have applied have, in a majority of cases, had positions waiting for them, and after being checked as eligible by the secretary's office, there seemed little occasion for rejections, thus the rejections have been few The National Office has had excellent cooperation from the states in the Union (also Alaska and Puerto Rico) who are members of the N A B P

I am sure that the various member boards are working in closer harmony with the National Office to carry out the broad purpose of reciprocity for which the N A B P was organized, rather than to withhold reciprocity from applicants through some petty ruling which is entirely local in character

#### LEGISLATION

As the subject of legislation will be covered very thoroughly in the report of the Legislative Committee, I shall not take further time here with these details I am thoroughly convinced, however, if the ideals of the N A B P are carried forward, every state embarking upon a legislative campaign should follow very closely the ideals set forth in the Model Pharmacy Law The National Office stands ready at all times to help the boards of pharmacy and the state pharmaceutical associations in drafting or checking any law they intend to present to the legislature If the members of the N A B P will work very closely with the secretary on all laws which pertain to pharmacy within the state, we will, in a few years, accomplish a great deal of good, not only for pharmacy but also for a healthier working arrangement between the states

#### DISTRICT MEETINGS

I know and feel that the financial situation in the various states is entirely responsible for the reduced number of district meetings held this year I can

truthfully say that if the financial conditions had been better, the vice-presidents elected last year would have held meetings in every one of the respective districts. Each vice-president accepted his office last year to carry on the work of the national association and I, for one, want to compliment them on the efforts they put forth to arrange for district meetings. Further, I want to compliment the vice-presidents in Districts Nos. 1 and 2 for being able to hold such successful and educational meetings during such a difficult year.

I feel that these district meetings are very important as they furnish a means of working out local problems which cannot be done at the annual conventions. However, there is also a danger, namely, that the local problems may be enlarged to a point where they take precedence over national affairs. If each district in arriving at conclusions will remember that there are eight other districts and that any change in established national policies must meet with approval by a majority of the boards composing *all* the districts, we shall avoid much misunderstanding and difficulty.

The only way we can make progress as a national organization is by keeping all the states or all the districts advancing to the same degree. Those districts or individual states that are inclined to be "slow," possibly on account of geographic conditions, sparse population or for other reasons, should be willing to speed up in order not to retard national growth and advances. Those in the more advantageous situations, geographically as well as to population and educational opportunities, can of course make progress a great deal more rapidly than states without these advantages. Such states are apt to become discontented with the apparently slow rate of national progress. In order to keep the whole organization of the N. A. B. P. working smoothly, we must find a method of pepping up the so-called "backward" states, at the same time urging those at the front of the parade not to run ahead too far. Reciprocally, a state loses out as much by being ahead of the general requirements as behind.

#### RE-DISTRICTING

Last year your president in his address recommended that the incoming president appoint a committee to study the problem of re-districting the various states. In the appointment of the Re-Districting Committee, I endeavored to pick members which would have a very broad view of the problem. I am sure that when Chairman Winne makes his report to this convention, he will have some suggestions to make that will overcome some of the objections of the past.

#### CHANGES IN CONVENTION PROGRAM

We have endeavored this year to arrange our convention program in such a way that the vice-presidents who were able to hold district meetings will be given sufficient time to present to the convention the high-lights of their meetings, or such matters which are of national interest. We have dispensed with the reports of the other vice-presidents in order to give us sufficient time to give consideration to the meeting reports. In the convention programs which follow, I am sure that this suggestion can be enlarged upon, so that the districts can work together more closely.

If more meetings are held during the next year, I would suggest that a round table discussion of the work of the districts be arranged after the annual banquet on Monday evening. Our present program of three sessions and one joint session is so crowded that we cannot add new material without sacrificing somewhere. As the members who attend this convention do so, I am sure, in the interest of fostering better examinations, they will welcome a session devoted to this subject.

#### CONSOLIDATION OF EXAMINING BOARDS

During the past year there was considerable agitation in a number of states for the consolidation of examining boards. In nearly every case, economies in the operation of the state government were given as the reason. The secretary's office prepared a "brief" of arguments against consolidation early last fall, which was supplied to any state threatened with this proposition. The fact that no complete consolidation plan was successful in any state in spite of the many threatening storms shows the alertness of the member boards in connection with the situation. Although the financial argument is the principal argument presented for consolidation, statistics on record in those states operating under the plan show that consolidation is more expensive than the individual board system, at least in so far as the professional boards are concerned.

#### DEPARTMENT OF EDUCATION

Owing to the financial situation, no bulletins were issued by the Department during the past year. Director Swain who has had charge of this work since 1929 will make a report later. The director and his associates have carried a message which did a great deal of good to those members who took the time to study the monthly bulletins.

Pharmaceutical education is changing from day to day and it is hard to predict what subject matter will be important to Board members in the next three or four years. I believe a thorough study should be made of the subject matter of these bulletins, when re-issued, so as to attract more attention from the Board members and make them look forward to receiving each copy.

#### AMERICAN COUNCIL ON PHARMACEUTICAL EDUCATION

I am certain that the new Council is going to do a great deal of good for all N A B P members. There is no information available since the organization meeting in Toronto. However, I feel that the three members of the Council, which I appointed to carry on the work for the National Association of Boards of Pharmacy, are men of broad vision, fully qualified to help solve our difficulties on educational standards and the necessary comprehensive study of pharmacy which will be required to set such standards.

#### SUPPLY AND DEMAND

Pharmacy has for years been building up a large supply of pharmacists due to prevailing low standards. That period has reached its end. Complete statistics from the various states show a great reduction in the number of applicants taking the Board examination during the past year. The financial situation is, of course,



somewhat responsible, but remember that so far as the boards are concerned, the three-year course is still in effect until 1936. The number matriculating in college under the four-year course also shows a decrease. The results should be a benefit to the profession of pharmacy at large. The future will bring a better class of pharmacists, properly trained, with the will to devote time and money to enter the profession.

#### THE CHICAGO OFFICE

It was my privilege during the past year to pay two visits to the Chicago office. I hardly believe that any member who has not visited this office can realize the vast amount and variety of work the Association is called upon to render. The secretary and his associates are to be highly complimented on the prompt and efficient way in which these various matters are disposed of. Nearly every letter received has to be handled in its own special way, and often much research in the way of gathering statistics, etc., must be done to make a proper reply, all of which takes time. The secretary has kept me informed of the more important work of the office by sending me copies of the letters going out from time to time. I have yet to hear the first complaint on the way this work is carried on and I consider this in itself the highest tribute the secretary could possibly be given. <sup>10</sup>

#### PHARMACY AT THE CHICAGO WORLD'S FAIR

When Secretary Christensen was president of the AMERICAN PHARMACEUTICAL ASSOCIATION, he urged that pharmacy be represented at the Chicago World's Fair. Later, the matter was brought up at the National Drug Trade Conference in Washington and the idea was given approval. A local committee was organized in Chicago to take charge of the matter and our secretary was made the chairman. The first proposition was to secure space. After a great deal of routine had been gone through, the Committee was finally successful in getting the officials of the Fair to give the space gratuitously, with pharmacy an integral part of the medical science group. Pharmacy was allotted 1700 sq ft of space, which has a commercial valuation of \$17,000.00.

The next problem was the kind of exhibit. The committee held many meetings. Every one affiliated with any branch of the drug industry was made welcome. Experts in the exhibit field were consulted, plans were drafted, and later approved. A budget of \$15,000.00 was outlined. The funds to install the exhibit were raised almost entirely by solicitation by correspondence. Manufacturers, wholesalers, retailers, journals, associations and individuals connected with pharmacy were asked to help. Much of the exhibit material was prepared by special committees in various parts of the country. The University of Wisconsin had charge of the Historical Exhibit, Purdue University of the Educational Display and the University of Illinois was called upon for much help. Committees, too, were kept busy planning various parts of the exhibit, such as the U S P and N F display. While the cost of building and installing the exhibit has been met, the Committee is still in urgent need of funds to carry on. Any one who has not made a contribution is invited to do so as early as possible, those who have contributed are urged to help in soliciting from others. The publicity value of this exhibit for the profession of pharmacy is tremendous.

The Pharmacy Exhibit is of great interest to those within the profession who are urged to register there when visiting the Fair. But most important of all, we are reaching the public for the first time with the story of how the pharmacist serves them professionally, the educational qualifications he must possess, etc. It is inevitable that the pharmacist will be held in higher esteem by those who have seen the exhibit. I consider this work one of the most important contributions that the N A B P has made to pharmacy, the Association claiming the credit for the splendid services rendered by its secretary. He has worked day and night to carry on this job in addition to his regular duties. The N A B P is fortunate to have as an officer of this Association a man with the executive ability to carry through such a project to a successful conclusion, one who has the confidence of the entire drug industry.

#### IN MEMORIAM

It is the duty of the president of this organization to pay tribute in his address to those members who have passed away during the year. The list this year fortunately is small but the men who have passed away are well known both in their respective states and to this Association. The following deaths have been reported

John B. Ebbs, Connecticut  
Gus Fischer, Missouri  
W. W. Largent, Missouri  
Edward B. Jones, New Jersey  
W. S. Parker, North Dakota  
Dan M. Chambliss, Tennessee

W. S. Parker was secretary of the North Dakota Board of Pharmacy for thirty five years, from 1892 to 1927, and well beloved by the many who knew him in this body. In view of the fact that we are not calling for individual tributes this year, I will now ask you to stand for a moment to pay silent tribute to these departed members.

#### RECOMMENDATIONS

From the problems presented to this organization during the past year, I would like to make the following recommendations:

- 1 That the various state boards encourage rather than retard reciprocity, inasmuch as this was the primary purpose and reason for organizing the Association.
- 2 That the extraordinary activities of this Association be discontinued, as they were in the past year until our finances warrant their resumption.
- 3 That the various districts in their meetings discuss not only the problems that pertain to the district but also problems of a national character which are important enough to come up for discussion at a round table conference at this convention.
- 4 That more time be allowed at this convention to those districts that held meetings during the year for the purpose of discussing any recommendations or suggestions that affect the Association as a whole. If no other time is available, a round table discussion could be arranged after the banquet on Monday evening.

#### CONCLUSION

The N A B P has accomplished a great deal in its thirty years of existence for the advancement of pharmacy. We have in the past year not only operated the Association considerably under the budget allowed, but we have through our

national office been able to carry the professional message of pharmacy to the outside world from the Hall of Science of the Century of Progress. Thus to me has been one of the big accomplishments of our Association.

It has been with a great deal of pride that I have been in a small way able to help carry on the work. The presidency of this body is the highest honor you have to bestow, and in closing this address, I want to express my sincere appreciation to the officers of the Association and my heartfelt thanks for the cooperation they have so freely given me.

In a few hours, I shall step back and a new leader will be at the helm. To him and to the new officers of the Association, I want to pledge my sincere support and cooperation for the advancement not only of the National Association of Boards of Pharmacy, but Pharmacy as a whole.

RESOLUTIONS AND RECOMMENDATIONS ADOPTED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION AT ITS EIGHTY-FIRST ANNUAL MEETING AT MADISON, WISCONSIN, AUGUST 28-SEPTEMBER 2, 1933, UPON RECOMMENDATION OF THE HOUSE OF DELEGATES THROUGH ITS COMMITTEE ON RESOLUTIONS

COMMITTEE ON NATIONAL LEGISLATION

The report of the Committee on National Legislation signed by four members of the Committee and an additional statement by the one member of the Committee not signing the report were referred to the Committee on Resolutions. Careful consideration of the report and the supplementary statement reveals no conflict of opinions and as neither the report nor the statement contained any recommendations the committee suggests that both be referred to the secretary of the Association for disposition.

ADDRESS OF PRESIDENT W. BRUCE PHILIP

We appreciate the careful thought given to the problems confronting our profession by President W. Bruce Philip as evidenced in his message to the AMERICAN PHARMACEUTICAL ASSOCIATION and we particularly call the attention of our members to his suggestion that definitions of the terms "drug store" and "pharmacy" be made the basis of an endeavor to limit the highest type of pharmaceutical service to those properly qualified to render such service.

ADDRESS OF CHAIRMAN J. W. SLOCUM OF THE HOUSE OF DELEGATES

We desire to record our appreciation of the effort of Chairman Slocum in bringing the importance of the contact of the State Pharmaceutical Associations with the AMERICAN PHARMACEUTICAL ASSOCIATION through the House of Delegates to the attention of State Associations and their officers.

We desire further to bring to the attention of the members of the AMERICAN PHARMACEUTICAL ASSOCIATION the suggestion of Chairman Slocum that the possibility of laying greater emphasis on courses in prescription writing in our medical schools be made the subject of study and possible recommendation.

SYMPOSIUM ON PROFESSIONAL PHARMACY

We desire to commend Professor E. Fullerton Cook and his co-workers for the splendid Symposium on Professional Pharmacy arranged at the Second General Session of this convention.

*No. 1. Reports of Delegates*

*Resolved*, that the Delegates to this convention be requested to prepare written reports for presentation to their respective constituent bodies and that such reports include a brief summary of the activities of the General Sessions, the sessions of the House of Delegates and the meetings

of the various Sections and Conferences together with a summary of the resolutions passed and be it further

*Resolved*, that the secretary be requested to assist delegates in the preparation of these reports by supplying a resume of the Proceedings to the end that a clearer conception of the wide spread activities of the AMERICAN PHARMACEUTICAL ASSOCIATION be communicated to retail pharmacists throughout the United States

#### *No 2 Code of Fair Trade Practices for the Retail Drug Trade*

Although the primary interest of the AMERICAN PHARMACEUTICAL ASSOCIATION lies in the field of the professional activity of the pharmacist it is recognized that the character and degree of service demanded by the public of the retail pharmacist is such as to require certain merchandising activities. As these activities must necessarily be regulated under the National Industrial Recovery Act be it

*Resolved* that retail pharmacists be urged to give their whole hearted cooperation to the President of the United States in his efforts to restore normal business conditions and prosperity and be it further

*Resolved* that the facilities of the AMERICAN PHARMACEUTICAL ASSOCIATION and the services of its officers and members be made available to Government agencies engaged in the preparation and enforcement of Codes of Fair Trade Practice and be it further

*Resolved* that every effort be made to incorporate into such codes the provisions necessary to enable the independent pharmacist to maintain his establishment on a satisfactory business basis and be it further

*Resolved* that the National Recovery Administration be urged to incorporate in any code of Fair Trade Practice for the Retail Drug Trade the right of contract of retailers with manufacturers wholesalers or distributors relative to price agreements on trade marked copyrighted or identified products and be it further

*Resolved* that the actions of the President of the United States in exempting Registered Pharmacists and other professional personnel from the provisions of the blanket code be commended and that a continuation of this policy in the final code for the retail drug industry be strongly urged in the interest of the general public welfare and be it further

*Resolved* that the thanks of the AMERICAN PHARMACEUTICAL ASSOCIATION be transmitted to retiring President Philip President Elect Swain Secretary Kelly and other members of the AMERICAN PHARMACEUTICAL ASSOCIATION who have been active in behalf of the independent retailer in the discussions with Government officials and others on this topic

#### *No 3 Dispensing of Liquor for Medicinal Purposes*

*Resolved* that the Officers and Council of the AMERICAN PHARMACEUTICAL ASSOCIATION be instructed to take such steps as they may deem necessary in the event of repeal of the 18th amendment to prevent the sale of beverage liquor in pharmacies or drug stores and be it further

*Resolved* that it shall be the declared policy of the AMERICAN PHARMACEUTICAL ASSOCIATION to favor the dispensing of liquor for medicinal purposes only on physicians' prescriptions

#### *No 4 Federal Food and Drug Law*

*Resolved* that the AMERICAN PHARMACEUTICAL ASSOCIATION record its approval of the proposed changes in the Federal Food and Drug Law in so far as they provide for more effective protection of the public health and be it further

*Resolved* that in the interest of a sound public policy the delegation of arbitrary discretionary powers in connection with the enforcement of Food and Drug legislation be disapproved

#### *No 5 Study of Closer Cooperation of American Pharmaceutical Association and National Association of Retail Druggists*

In view of the several suggestions that have come before the AMERICAN PHARMACEUTICAL ASSOCIATION during this annual meeting and in view of the frequently expressed sentiment of pharmacists throughout the United States in favor of the development of closer cooperation between the National Association of Retail Druggists and the AMERICAN PHARMACEUTICAL ASSOCIATION, be it

*Resolved* that the AMERICAN PHARMACEUTICAL ASSOCIATION hereby expresses its deep interest in this subject and authorizes its Council to appoint members of a joint commission to make a careful study of the matter provided the organization of such a commission is agreeable to the National Association of Retail Druggists

*No 6 Technical Equipment in Pharmacies*

*Resolved*, that Boards of Pharmacy be urged to develop minimum standards of technical equipment to be required of pharmacies engaged in the compounding of prescriptions and in supplying other professional pharmaceutical services

*No 7 Pharmacy Week*

*Resolved*, that the members of the AMERICAN PHARMACEUTICAL ASSOCIATION be encouraged to continue their support of the movement to bring the professional aspects of pharmacy to the attention of the public through the observance of National Pharmacy Week

*No 8 Recognition of Pharmacists in Government Service*

*Resolved*, that the efforts of the AMERICAN PHARMACEUTICAL ASSOCIATION to obtain recognition of pharmacy in the various branches of the Government services commensurate with the high type of professional service rendered, be continued

*No 9 Cooperation with Surgeon General of U S Army for a More Satisfactory Type of Pharmaceutical Service*

*Resolved*, that the AMERICAN PHARMACEUTICAL ASSOCIATION continue its active cooperation with the Surgeon General of the United States Army in bringing about a more satisfactory type of pharmaceutical service in the Army and proper recognition of the personnel rendering this service

*No 10 Thanks to Council on Medical Education and Hospitals of American Medical Association*

*Resolved* that the thanks of the AMERICAN PHARMACEUTICAL ASSOCIATION be expressed to the Council on Medical Education and Hospitals of the American Medical Association for the favorable attitude expressed by resolution of this body on the subject of hospital pharmacies and their supervision and be it further

*Resolved* that the AMERICAN PHARMACEUTICAL ASSOCIATION continue its endeavors to provide for the supervision of all pharmaceutical work in hospitals by registered pharmacists

*No 11 Historical Material for Museum and Library of Headquarters Building*

*Resolved* that the Local Branches of the AMERICAN PHARMACEUTICAL ASSOCIATION, State Pharmaceutical Associations, Boards and Colleges of Pharmacy as well as other organizations and individuals interested in the progress and development of pharmacy be urged to supply documents of historical interest relics and museum material to the museum and library of the Headquarters Building of the AMERICAN PHARMACEUTICAL ASSOCIATION at Washington and be it further

*Resolved* that organizations and individuals interested in the progress of pharmacy be urged to prepare papers on matters of historical interest for presentation to the Section on Historical Pharmacy of the AMERICAN PHARMACEUTICAL ASSOCIATION

*No 12 Survey of Resolutions of Former Conventions*

*Resolved*, that a survey of the Proceedings and JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION be made for the purpose of assembling and classifying the resolutions passed at the annual conventions. It is suggested in this connection that this task be assigned to the Section on Historical Pharmacy and that the first report be limited to a survey of the resolutions adopted in the past twenty five years

*No 13 Official Recognition of the Pharmaceutical Syllabus*

*Resolved* that we express our appreciation of the work of the National Pharmaceutical Syllabus Committee culminating in the publication of the Syllabus for the four-year course in pharmacy and that we concur in the recommendation of Chairman J G Beard of the Syllabus

Committee to the effect that the Syllabus be given official recognition by colleges and boards of pharmacy

*No 14 Appreciation of the Efforts of the Headquarters Building Committee*

*Resolved*, that the AMERICAN PHARMACEUTICAL ASSOCIATION record its appreciation of the efforts of the Headquarters Building Committee in carrying the splendid building project in the City of Washington to completion

*No 15 Thanks to Committee on Century of Progress Pharmacy Exhibit*

*Resolved*, that the AMERICAN PHARMACEUTICAL ASSOCIATION express its appreciation and thanks to the Committee on World's Fair Exhibit for the excellent manner in which they have arranged for the portrayal of the Progress of Pharmacy at the Century of Progress in Chicago and urge all pharmacists to make a financial contribution toward defraying the expenses of this splendidly successful undertaking

*No 16 Congratulations and Appreciation on Completion and Publication of Prescription Ingredient Survey*

*Resolved* that the congratulations and appreciation of the AMERICAN PHARMACEUTICAL ASSOCIATION be expressed to Chairman E N Gathercoal of the Committee on National Formula and his co workers for the completion and publication of the Prescription Ingredient Survey

*No 17 Resolution of Thanks to Hosts*

*Resolved* that the AMERICAN PHARMACEUTICAL ASSOCIATION extend its sincere thanks to Local Secretary Emerson D Stanley, Chairman Oscar Rennebohm and the members of the Convention Committee, Mrs Adolph F Menges, Chairman of the Women's Committee, and the members of this Committee, Dr and Mrs Edward Kremers, as well as the many other Wisconsin pharmacists for their splendid hospitality

*No 18 Resolution on Death of Dr Henry G Greenish*

*Resolved* that the AMERICAN PHARMACEUTICAL ASSOCIATION record its sorrow at the demise of Dr Henry G Greenish, distinguished British pharmacognosist and pharmaceutical educator and be it further

*Resolved*, that the condolences of the AMERICAN PHARMACEUTICAL ASSOCIATION be expressed to the British Pharmaceutical Society and to the members of the family of the deceased

ABSTRACTS OF PAPERS PRESENTED BEFORE SCIENTIFIC SECTION, A PH A

A Comparative Study of the Maryland and the Official Sennas " by Frank J Slama —A comparative study is made of the following six sennas *Cassia Senna*, *C angustifolia*, and four Maryland sennas, *C Marylandica* *C Medsgeri* *C nictitans* and *C Chamaecrista* The stomata neighboring cells epidermal cells and the distribution of epidermal hairs of the upper and lower surfaces of the leaflets are compared A study is also made of the margins, apices, petioles glands on the petioles and the cross sections of the leaflets From the differences noted, the sennas are separated into three groups Group I the official sennas, Group II, *C Marylandica* and *C Medsgeri* and Group III *C nictitans* and *C Chamaecrista*

'The Co Fe-Cu Fluids as Applied to U S P Tests" by H V Arny and A Taub —Report of a study carried on at the request of the U S P sub committee on organic chemicals of the colors produced in performing the test of U S P IX for readily carbonizable substances" The colors produced by the action of sulphuric acid on 48 official organic chemicals in Lovibond units and matches prepared from Arny's CO-FE CU standardized colored fluids will be reported and demonstrated Prior work by Arny and by Taub on matching the color of official fixed oils will be reviewed with particular reference to the inclusion of these color comparisons in U S P XI

Medicinal Cod Liver Oil—Observations on Color and Viscosity by George E Ewe —The origin of the color of cod liver oil is discussed and the influence of various factors upon the color and viscosity of this oil is recorded and discussed

## THE PROFESSIONAL PHARMACY \*

BY FRANK A. DELGADO AND ARTHUR A. KIMBALL, U. S. DEPARTMENT OF COMMERCE

*(Continued from page 782)*

## CHAPTER V. PRESCRIPTION INVENTORY PROBLEMS AND INGREDIENT ANALYSIS

The information in this chapter, and the list of leading ingredients at the end of the report, should be of particular value to the pharmacist who is opening a new drug store, as an aid in ordering his basic or opening prescription department inventory, and to wholesalers in preparing a suggested list for the opening order. With approximately 2500 pharmacy students graduating and 1800 new drug stores opening every year the occasion for an opening order happens not infrequently. However most pharmacists will recognize the inventory problem as one which has been very trying to them and it is hoped that some of the suggestions made in this chapter will assist them in solving this problem.

Later in this chapter it is shown that a maximum of 1274 different ingredients is required to fill 10,000 prescriptions. However, only 358 or 28 per cent of these 1274 ingredients will be called for as many as 10 times each in filling the 10,000 prescriptions. As the average drug store does not fill many more than 10,000 prescriptions in three years it will be seen that 500 prescription department items distributed judiciously among chemicals, galenicals and manufacturers' specialties should prove to be an adequate opening order. Of course, these 500 items should be made up of those items which are shown in the list of leading ingredients to have been at least in fairly good demand. In a given community there may be several items not on the list, which because of unusual circumstances are in quite frequent demand. However the wholesaler could bring such items to the attention of the druggist. The list of leading ingredients does not include manufacturers' specialties because the policy of the Bureau of Foreign and Domestic Commerce does not permit the publishing of trade name items. However, the United States Pharmacopœia and National Formulary Revision Committees have published lists of leading ingredients based on their extensive prescription studies which should be an excellent medium for selecting an assortment of manufacturers' specialties most frequently prescribed. These lists could also be used to check the list of chemicals, drugs and galenicals published in this report.

Of course, the new drug store does not ordinarily have a very large prescription business at the start, but has to build up this business over a period of years. Later in this chapter, a tabulation showing the number of prescriptions filled the first year in business by a number of drug stores is shown and this business is compared with their present prescription business. If the new drug store averages one prescription a day for the first year, or 365 prescriptions for the year, approximately 300 different ingredients will be needed. Table 33 shows the number of different ingredients required for the first 500 prescriptions and for each succeeding block of 500 prescriptions.

The average number of prescription department items in each of the 11 commercial type stores studied in the survey (from preliminary figures which may be reduced 5 or 10 per cent after editing to combine similar items) was 1474, of which a great number were not called for at all during the year of the survey. The average store would have to fill considerably more than 10,000 prescriptions a year if each of 1474 different items was to be used at least once in the year. In 8 commercial type drug stores studied in this survey, an average of 608 different ingredients was required to fill an average of 1883 prescriptions per store. It will be seen that more than half of the 1474 ingredients stocked were not called for even a single time in filling nearly 2000 prescriptions.

Among other disadvantages of a prescription department inventory which is cluttered with many inactive items is the expense involved. Any operating improvement which cuts down expense is particularly important during this time of depression, especially in view of the increasing number of failures in the industry. One reliable report states that the increase in the number of failures among wholesalers and retailers (in the drug industry) has been continuous.

\* See Table of Contents page 671, July issue of the JOURNAL.—This installment covers Chapters V and VI which see

since 1930, with the total for 1932 rising to 1387 the highest recorded in the last five years, and comparing with 1171 in 1931." The report just quoted is based on figures compiled by R G Dun & Company

#### OPENING BUSINESS AND EXTENT OF GROWTH OF THE DRUG STORE'S PRESCRIPTION DEPARTMENT

The first part of the following table shows the opening and present business in the prescription departments of 10 of the commercial type drug stores studied in connection with the National Drug Store Survey in St. Louis, Mo. These 10 stores had been in business an average of about 9 years in 1931 when the statistics were gathered, and in all but one case were still managed by the original proprietor. The 10 stores averaged 8.6 prescriptions each per day in the first year, although this average is distorted somewhat by the fact that refills are included for five stores. In five cases no record had been kept of the number of refills handled the first year, but generally the refill business of a store is not of great importance during its first year. For the year ending April 30, 1931, the 10 stores averaged 11.9 prescriptions each per day including refills, an average increase of 3.3 prescriptions each, daily. Eight of the 10 stores individually had an increased prescription business. After a drug store has been established for a number of years, the refill business generally becomes of considerable importance. The average gain of the 10 stores is almost entirely accounted for by the refill business. If the refills were omitted from consideration in the year ending April 30, 1931 the five stores which did not keep a record of refills during their opening year would average a loss in prescription compounding, as compared with the first year.

For the sake of comparison a similar study was made in 13 drug stores located in two Eastern cities. These 13 stores had been in business for an average of about 15 years each when this study was made in 1932 and 1933. These stores averaged 7 prescriptions each a day during their first year of operation, and average 12.4 prescriptions each daily at the present time, an increase of 5.4 prescriptions each per day. For only 4 of the 13 stores are refills included. If refills were added to the prescriptions shown for the other 9 stores, the average daily prescription activity would probably be a noticeably higher figure, and some of the 6 stores which show a decrease in the number of prescriptions filled would probably show an increased prescription practice.

It is interesting to note that those stores which had the smallest opening prescription service tended to have an increased business while the opposite was true for those stores which started with a good prescription practice the first year. However one store which filled an average of 9.9 prescriptions daily its first year (1921) quadrupled the number of its prescriptions and another store, which averaged 10.3 prescriptions daily in 1916 when it opened, nearly tripled the number of its prescriptions. On the other hand one store filled an average of less than one prescription a day in 1929 when it opened, and in 1932 showed only a slight increase, at that time averaging only 1.4 prescriptions daily.

The facts shown in the accompanying table point out strongly the necessity of using judgment and care in selecting the opening stock for the prescription department of a drug store. The average new store will fill only from 2500 to 3000 prescriptions its first year and thus only a fraction of the prescription department items which could be stocked will actually be prescribed the first year. The wise plan is to purchase in the opening order only those items which are known to have frequent occurrence (and of course items of an emergency nature), and then to obtain other items as they are actually prescribed. Care should also be used when placing the opening order of containers, corks and other accessories and supplies to avoid overstocking.

These actual examples show clearly how some stores build up their prescription business in some cases after starting with a good volume while in other stores this phase of the business is evidently neglected or at least not promoted to the fullest extent. Some proprietors of stores who started with a nice prescription volume must have taken this as a matter of course, doing nothing to build it further or even to keep up the opening volume. Of course, certain factors, such as location of the store limit the possibilities of increasing the volume of prescriptions, some stores would never be able to increase the volume to 40 prescriptions a day for example. But in most cases it is possible to substantially increase the prescription business over the volume of the opening year and with proper management the profit possibilities of the prescription department are greatly enhanced as the volume becomes greater. Certainly, for example, the



proprietor of the store which after three years has only increased its prescription business to an average of 1.4 prescriptions a day has not made any noticeable effort to promote the professional phase of the drug store

The questionnaire professional stores in 1932 had been in business for an average of 17 years. During the opening year these stores averaged 23.5 prescriptions each per day, while in 1932 they averaged 73 prescriptions each daily. Nine of these professional stores started quite inauspiciously averaging only from 2 to 10 prescriptions each per day during the first year. However, five stores started with a large volume averaging from 31 to 150 prescriptions each per day in the opening year. Some of those stores which started with such a small volume are

TABLE XXVII — COMPARISON OF OPENING AND PRESENT PRESCRIPTION BUSINESS IN 10 COMMERCIAL TYPE DRUG STORES IN ST. LOUIS, MO

Date Store Opened	First Year in Business		Year Ending April 30 1931		Daily Net Change
	No of Prescriptions	Daily Average	No of Prescriptions Including Refills	Daily Average	
1924	792	2.2	2394	6.5	+4.3
1925	1267 <sup>1</sup>	3.5 <sup>1</sup>	4046	11.1	+7.6
1926	1496 <sup>1</sup>	4.0 <sup>1</sup>	2269	6.2	+2.2
1929	2189	6.0	5150	14.1	+8.1
1906	2522 <sup>1</sup>	6.9 <sup>1</sup>	4561	12.5	+5.6
1911	2571	7.0	4126	11.3	+4.3
1924	2731	7.5	2314	6.3	-1.2
1924	5266 <sup>1</sup>	14.4 <sup>1</sup>	7197	19.7	+5.3
1924	6237	17.0	3675	10.0	-7.0
1926	6499 <sup>1</sup>	17.8 <sup>1</sup>	7883	21.6	+3.8
Average	3157	8.6	4362	11.9	+3.3

<sup>1</sup> Includes refills

COMPARISON OF OPENING BUSINESS AND PRESENT PRESCRIPTION BUSINESS IN DRUG STORES IN TWO EASTERN CITIES

Date Store Opened	First Year in Business		Most Recent Year <sup>1</sup>		Daily Net Change
	No of Prescriptions	Daily Average	No of Prescriptions	Daily Average	
1929	306	0.8	521	1.4	+0.6
1872	1161	3.2	2,526	7.0	+3.8
1928	1200	3.3	3,500	9.6	+6.3
1925	1828	5.0	8,769	24.0	+19.0
1889 <sup>2</sup>	1852	5.1	6,066	16.6	+11.5
1920	2127	5.8	1,705	4.7	-1.1
1926	2500	6.8	1,625	4.5	-2.3
1923	2835	7.8	1,954	5.4	-2.4
1917	2948	8.1	723	2.0	-6.1
1921 <sup>2</sup>	3600	9.9	14,858	40.7	+30.8
1916 <sup>2</sup>	3756	10.3	9,862	27.0	+16.7
1925	4053	11.1	2,494	6.8	-4.3
1928 <sup>2</sup>	5064	13.9	4,099	11.2	-2.7
Average	2556	7.0	4,516	12.4	+5.4

<sup>1</sup> In some cases the calendar year 1932 was used and in other cases the year from April 1932 to April 1933 was used. <sup>2</sup> Refills are included in the prescriptions shown for these stores

NOTE Another store studied had opened on June 1, 1932, and thus could only report its prescription business for the first 10 months during which time it averaged only 1.3 prescriptions per day

good examples of how a prescription business can be built up from almost nothing until the store has such a large volume that it changes from a commercial type store to a professional pharmacy

PRESCRIPTION INGREDIENT REQUIREMENTS AND OCCURRENCE BY TYPE OF INGREDIENT IN  
PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES

An analysis was made of 10,000 prescriptions filled by professional pharmacies A and B and 10,000 prescriptions filled in commercial type drug stores to determine the number of different ingredients required and the number of times these different ingredients were used in filling these prescriptions

It was found that a total of 1186 different items were prescribed in the 10,000 prescriptions from the professional pharmacies, while it would be necessary to carry 1274 different items in stock to fill the 10 000 prescriptions from the commercial type drug stores. The 1186 different ingredients of the professional store prescriptions were actually used 20,077 times, or an average of about 2 ingredients per prescription. This compares with an average of over 2.5 ingredients per prescription in the 10 000 prescriptions filled by commercial type stores, the 1274 different items required in filling these prescriptions being used a total of 25,196 times.

In both cases, chemical ingredients amounted to less than one fifth of the total number of different ingredients but were called for in the prescriptions about as often as galenicals and manufacturers specialties combined. The chemical ingredients were much more active than specialties or galenicals, showing that chemicals have the least and specialties the most chance of becoming shelf warmers. For example in the 20 000 prescriptions from both types of stores, the 280 different chemicals were called for an average of 80.8 times each, while the 700 galenicals were prescribed an average of only 18.7 times each, and the 745 specialties only 12.8 times each.

Of the 1186 different items which would have to be stocked to fill the 10 000 professional

TABLE XXVIII —NUMBER OF DIFFERENT INGREDIENTS, BY TYPE OF INGREDIENT, REQUIRED IN FILLING PRESCRIPTIONS IN PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES, AND THE NUMBER OF TIMES EACH OF THE DIFFERENT TYPES OF INGREDIENTS OCCURRED

10 000 Professional Store Prescriptions					
Type of Ingredient	Number of Different Ingredients	Per Cent of Total	Number of Times Ingredients Occurred	Per Cent of Total	Average Number of Times Each Ingredient Occurred
Chemicals	217	18.3	9 628	47.9	44.4
Galenicals	436	36.7	5 455	27.2	12.6
Specialties	533	45.0	4 994	24.9	9.4
Total	1186	100.0	20 077	100.0	17.0
10 000 Commercial Type Drug Store Prescriptions					
Type of Ingredient	Number of Different Ingredients	Per Cent of Total	Number of Times Ingredients Occurred	Per Cent of Total	Average Number of Times Each Ingredient Occurred
Chemicals	235	18.4	12 993	51.6	55.3
Galenicals	554	43.5	7 653	30.4	13.8
Specialties	485	38.1	4,550	18.0	9.4
Total	1274	100.0	25 196	100.0	19.8
Total 20 000 Prescriptions					
Type of Ingredient	Number of Different Ingredients	Per Cent of Total	Number of Times Ingredients Occurred	Per Cent of Total	Average Number of Times Each Ingredient Occurred
Chemicals	280	16.2	22 621	50.0	80.8
Galenicals	700	40.6	13 108	28.9	18.7
Specialties	745	43.2	9,544	21.1	12.8
Total	1725	100.0	45 273	100.0	26.2

store prescriptions, 533 or 45 per cent, would be manufacturers' specialties. Only 38.1 per cent of the 1274 different items called for in the 10,000 prescriptions from the commercial type drug stores were specialties, however. Nevertheless, manufacturers' specialties were called for only 24.9 per cent of the time in the professional store prescriptions and only 18 per cent of the time in the prescriptions filled by commercial type drug stores.

It should be remembered that the professional store prescriptions were obtained from but two pharmacies, while the 10,000 commercial type store prescriptions were obtained from six commercial type pharmacies, including a chain store unit. Thus a larger number of physicians wrote the 10,000 commercial type store prescriptions than wrote the 10,000 prescriptions filled by the professional drug stores. This explains the fact that a larger number of different items were called for in the 10,000 prescriptions from the commercial type drug stores.

If the 10,000 prescriptions from professional pharmacies and the 10,000 from commercial type pharmacies are combined, the 20,000 prescriptions would require a total of 1725 different ingredients. After filling the 10,000 prescriptions from the professional pharmacies, which required 1186 different ingredients, only 539 additional different ingredients would be required to fill the 10,000 commercial type store prescriptions. Only 63 additional chemicals would have to be stocked, but 264 galenicals and 212 specialties in addition to those called for in the 10,000 professional store prescriptions would be required.

TABLE XXIX.—FREQUENCY OF OCCURRENCE OF INGREDIENTS IN PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES

Occurrence of Ingredients	10 000 Prescriptions from Professional Pharmacies			
	Number of Ingredients	Per Cent of Total	Number of Occurrences	Per Cent of Total
Once	375	31.62	375	1.87
Twice	150	12.65	300	1.49
3 times	87	7.34	261	1.30
4 times	55	4.64	220	1.09
5-9 times	196	16.52	1,335	6.65
10-25 times	161	13.57	2,525	12.58
26-50 times	66	5.56	2,494	12.42
51-100 times	57	4.81	4,037	20.11
101-200 times	25	2.11	3,355	16.71
201-500 times	13	1.10	4,031	20.08
Over 500 times	1	0.08	1,144	5.70
Total	1186	100.00	20,077	100.00
Occurrence of Ingredients	10 000 Prescriptions from Commercial Type Stores			
	Number of Ingredients	Per Cent of Total	Number of Occurrences	Per Cent of Total
Once	407	31.95	407	1.62
Twice	171	13.42	342	1.36
3 times	103	8.08	309	1.23
4 times	69	5.42	276	1.10
5-9 times	166	13.03	1,089	4.32
10-25 times	177	13.89	2,808	11.14
26-50 times	72	5.65	2,619	10.39
51-100 times	53	4.16	3,629	14.40
101-200 times	35	2.75	5,059	20.08
201-500 times	15	1.18	4,515	17.92
Over 500 times	6	0.47	4,143	16.44
Total	1274	100.00	25,196	100.00

FREQUENCY OF OCCURRENCE OF PRESCRIPTION INGREDIENTS

In the table below the 1274 different ingredients occurring in 10,000 prescriptions from commercial type drug stores and the 1186 different ingredients prescribed in 10,000 prescriptions

filled by professional pharmacies are classified according to the number of times each was prescribed in 10 000 prescriptions. In both groups of prescriptions, more than half of the different ingredients prescribed were used very infrequently, being called for less than five times each. These infrequently used ingredients were called for a total of only 2490 times in 20 000 prescriptions. On the other hand, those ingredients which were prescribed five times or more each were called for a total of 42,783 times in the 20,000 prescriptions. Thus, when a physician wrote an item on his prescription blank, in over 94 per cent of the cases that item was one of the minority group of items occurring more than five times.

Of course, those items which individually occurred a large number of times were of outstanding importance. For example, in the 10 000 prescriptions from the commercial type stores there were 56 items which were each prescribed at least 100 times. These 56 items represented only 4.4 per cent of the 1274 different items prescribed. Yet these 56 leading ingredients were prescribed a total of 13,717 times or in 54.4 per cent of the 25,196 occurrences of ingredients. A similar situation existed in the case of the ingredients which had the greatest demand in the professional store prescriptions.

It is interesting to note the consistency between the two blocks of prescriptions as regards the number of ingredients in each frequency group and the standing of each frequency group in the total number of occurrences. In both the commercial type and professional store prescriptions for example approximately 32 per cent of the different ingredients were prescribed just one time each, and in both cases these "shelf warmers" represented less than 2 per cent of the total number of occurrences of ingredients.

Thus it is shown that only a comparatively small number of prescription items out of the many usually stocked are important from a movement standpoint. For example, in the professional store prescriptions only 519 out of the 1186 different ingredients prescribed were called for as many as five times or more. If these 519 ingredients only had been stocked, they would have yet been sufficient for 94 out of every 100 ingredients prescribed. Or in only 6 cases out of 100 would an item not in stock have been prescribed. Yet the items of rare occurrence ran the number of ingredients required in filling the 10,000 professional store prescriptions up to a total of 1186.

#### NUMBER OF INGREDIENTS REQUIRED PER PRESCRIPTION

Table XXX shows the number of ingredients used per prescription in two professional drug stores. In both stores slightly less than half of all the prescriptions studied consisted of only one ingredient. Only about 28 per cent of the narcotic prescriptions, in both stores contained just a single ingredient. Thus it will be seen that over half of the prescriptions in both stores contained more than one ingredient, and a considerable number contained six, seven or eight ingredients. As a total for both stores, nonnarcotic prescriptions contained an average of two ingredients while narcotics averaged 2.7 ingredients. The average number of ingredients per prescription was higher in professional Store A than in Store B for both types of prescriptions.

It is somewhat surprising to note that the average number of ingredients per prescription was considerably lower in these professional pharmacies than in the 13 usual commercial type drug stores reported in the first prescription department report. The 13 usual type drug stores had an average of 2.5 ingredients per prescription, the average being 2.4 for nonnarcotic and 3.2 for narcotic prescriptions. This difference is probably brought about by the much larger variety of manufacturers' trade name specialties, biologicals, allergics, etc. carried by professional pharmacies. The professional drug stores carry a wider variety of prescription ingredients than do the commercial type stores, having on hand many items which are called for rarely. Obviously simple, as well as difficult, prescriptions are filled by the professional stores. This fact suggests that professional stores doing a large business might allocate all single ingredient and simple prescriptions to their younger and less experienced personnel. Naturally, such prescription clerks would be expected to fill more prescriptions of this type, in a given period, than if they were filling more difficult prescriptions.

Despite statements frequently made to the contrary, the average number of ingredients contained in a prescription has not decreased, or at least, not in the professional store herein studied.

TABLE XXX —NUMBER OF INGREDIENTS PER PRESCRIPTION BY TYPE OF PRESCRIPTION, FOR TWO PROFESSIONAL DRUG STORES IN 1930-1931

Number of Ingredients	Nonnarcotic Store A		Store B		Narcotic Store A		Store B		Nonnarcotic Store A		Narcotic Store B	
	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent
1	1841	45 0	1496	49 9	299	27 7	142	28 4	2140	41 4	1638	46 8
2	810	19 8	736	24 6	153	14 2	170	34 0	963	18 6	906	25 9
3	747	18 3	522	17 4	299	27 7	110	22 0	1046	20 2	632	18 1
4	458	11 2	193	6 4	137	12 7	43	8 6	595	11 5	236	6 7
5	182	4 4	46	1 5	126	11 7	30	6 0	308	6 0	76	2 2
6	43	1 0	6	0 2	42	3 9	3	0 6	85	1 7	9	0 3
7	8	0 2			19	1 8	2	0 4	27	0 5	2	0 0+
8	3	0 1	1	0 0	3	0 3			6	0 1	1	0 0+
Total	4092	100 0	3000	100 0	1078	100 0	500	100 0	5170	100 0	3500	100 0
Type of Prescription	Store A		Store B		Total Both Stores		Average per Prescription		Number of Ingredients		Average per Prescription	
Nonnarcotic	3 782	2 1	5580	1 9	14 362	2 0						
Narcotic	3,089	2 9	1166	2 3	4 255	2 7						
Total	11 871	2 3	6746	1 9	18 617	2 1						

In order to ascertain whether or not there has been any change in the average number of ingredients per prescription in the past 20 years, 1000 prescriptions filled in 1910 and 1000 filled in 1920 in professional Store A were examined and the results are shown in the table below. It will be seen that there is little change in the average number of ingredients per prescription for all prescriptions studied, being 2.2 ingredients in 1910 and 2.3 in 1920 and 1930. However, when nonnarcotic and narcotic prescriptions are considered separately, the average number of ingredients per prescription for each type was a little higher in 1930 than in 1920.

TABLE XXXI —NUMBER OF INGREDIENTS PER PRESCRIPTION BY TYPE OF PRESCRIPTION IN PROFESSIONAL STORE A IN 1910 AND 1920

Number of Ingredients	1910 All Prescriptions		Nonnarcotic		1920 Narcotic		All Prescriptions	
	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent	Number of Prescriptions	Per Cent
1	397	39 7	403	47 4	34	22 7	437	43 7
2	242	24 2	152	17 9	29	19 3	181	18 1
3	204	20 4	135	15 9	28	18 7	163	16 3
4	110	11 0	101	11 9	24	16 0	125	12 5
5	27	2 7	42	4 9	23	15 3	65	6 5
6	14	1 4	11	1 3	5	3 3	16	1 6
7	4	0 4	3	0 4	2	1 3	5	0 5
8	1	0 1						
9					4	2 7	4	0 4
10	1	0 1	1	0 1	1	0 7	2	0 2
11			2	0 2			2	0 2
Total	1000	100 0	850	100 0	150	100 0	1000	100 0
Type of Prescription	1910		1920		Average per Prescription		Average per Prescription	
Nonnarcotic	Number of Ingredients	Unknown	Number of Ingredients	Unknown	1845	2 2	2 2	
Narcotic	Number of Ingredients	Unknown	Number of Ingredients	Unknown	477	3 2	3 2	
Total	2198	2 2	2322	2 3				

In 1910, 39.7 per cent of the prescriptions studied in Store A contained only one ingredient, as compared with 43.7 per cent in 1920 and 41.4 per cent in 1930, showing that there is little variation in this respect. The highest number of ingredients found in a single prescription in 1930 was 8, while in 1910 and 1920 as many as 10 or 11 ingredients were used in filling a single prescription in a few cases.

#### PRIVATE FORMULA PRESCRIPTIONS

Of the 5474 prescriptions studied in professional Store A, 304 or 5.5 per cent were private formula prescriptions. These prescriptions were studied separately and the results of this study are presented in the table below. The private formula prescriptions are not included in most of the other tables in this report, and for this reason are given special treatment here. No private formula prescriptions were studied for professional Store B, inasmuch as this store filled very few prescriptions of this type.

The table shows that physicians practicing internal medicine and dermatologists wrote a large part of these private formula prescriptions, together writing about 75 per cent of the 304 prescriptions. Of the 38 doctors practicing internal medicine, 8 wrote private formula prescriptions. These 8 doctors averaged 16.9 private formula prescriptions each, this type of prescription representing 13.3 per cent of all their prescriptions studied. Private formula prescriptions occupied an even more important place in the business of the individual dermatologist, an average of 23 such prescriptions being written by each dermatologist who wrote this type of prescription. However, 60.5 per cent of the private formula prescriptions were written by two doctors. One, who practiced internal medicine wrote 102 such prescriptions, while the other a dermatologist, wrote 82 private formula prescriptions. The former ranked third among the doctors contributing the prescriptions studied in this store for 1930 while the latter was second.

It is interesting to note that of the 304 private formula prescriptions, only 17 were narcotic prescriptions. Of these 17 narcotic prescriptions, 6 were written by one doctor and 5 by another.

Although not shown in the table, Stores C and D both manufactured from physicians' private formulas. In Store C approximately 25 per cent and in Store D approximately 10 per cent of the total prescription business is of a private formula character according to the estimates of the proprietors.

Sixty per cent of the 35 questionnaire stores do not fill many private formula prescriptions but the other 40 per cent fill a large number of such prescriptions. Eighteen of the questionnaire stores prepare and submit formulas to physicians.

TABLE XXXII — PRIVATE FORMULA PRESCRIPTIONS BY TYPES OF PRACTICE OF PHYSICIANS PRESCRIBING THEM

Type of Practice					By Doctors Writing Private Formula Prescriptions		
	Number of Doctors Writing Private Formula Prescriptions	Total Number of Doctors	Number of Private Formula Prescriptions	Per Cent of Total Private Formula Prescriptions	Number of Other Prescriptions Written	Per Cent Private Formula	Average Number of Private Formula Prescriptions per Doctor
Internal Medicine	8	38	135	44.41	879	13.3	16.9
Dermatology	4	7	92	30.26	367	20.0	23.0
Oculists	4	28	30	9.87	56	34.9	7.5
Ear, Nose and Throat	4	16	21	6.91	115	15.4	5.3
General Practice	6	58	14	4.60	254	5.2	2.3
Neurology	1	5	6	1.97	8	42.9	6.0
Surgery	1	21	2	0.66	36	5.3	2.0
Gynecology	1	14	1	0.33	13	7.1	1.0
Unknown	3	" "	3	0.99	1	75.0	1.0
Total	32		304	100.00	1729	15.0	9.5

NUMBER OF ADDITIONAL INGREDIENTS REQUIRED IN FILLING SUCCESSIVE BLOCKS OF 500 PRESCRIPTIONS

The study presented in Table XXXIII below, is believed to give a clear picture of the difficulties confronting the pharmacist as regards the prescription ingredients which must be stocked to meet the demand of his customers. Ten thousand prescriptions from two professional pharmacies and 10 000 from commercial type drug stores were the basis of this analysis. In each group, the prescriptions were considered in blocks of 500 prescriptions.

In the professional stores, for example, 328 different ingredients were required in filling the first 500 prescriptions. In the next 500 prescriptions, 121 new ingredients were required. Even after filling 5000 prescriptions, when the pharmacist might think he had built up a pretty widely assorted stock of prescription ingredients to care for his prescription demands, 34 new ingredients not called for previously are required. With each succeeding block of 500 prescriptions, the number of new ingredients required generally diminishes, but even in the 20th block, 10 new ingredients were prescribed.

TABLE XXXIII—STUDY OF 10 000 COMMERCIAL TYPE DRUG STORE PRESCRIPTIONS AND 10 000 PRESCRIPTIONS FROM TWO PROFESSIONAL PHARMACIES TO DETERMINE THE NUMBER OF ADDITIONAL INGREDIENTS CALLED FOR IN EACH BLOCK OF 500 PRESCRIPTIONS

Block	Number of Different Ingredients Not Appearing in a Previous Block		Block	Number of Different Ingredients Not Appearing in a Previous Block	
	Professional	Commercial		Professional	Commercial
1st	328	303	11th	34	35
2nd	121	173	12th	29	58
3rd	96	110	13th	19	50
4th	74	73	14th	26	21
5th	69	62	15th	29	19
6th	51	69	16th	41	20
7th	47	28	17th	32	15
8th	41	44	18th	15	15
9th	52	57	19th	20	47
10th	52	35	20th	10	40
Total				1186	1274

It will be noted that the same general condition existed in the 10 000 commercial type store prescriptions, except that a larger number of different ingredients was required, 1274 for the 10 000 prescriptions as against 1186 for the 10,000 prescriptions from the professional pharmacies. The probable reason for this is that a larger number of doctors had a part in writing the prescriptions than was true for the professional store prescriptions, which were all obtained from two professional pharmacies. Generally, a physician prescribes within a fairly limited range of ingredients so the smaller the number of physicians contributing to the prescription business, the fewer different ingredients are required.

Blocks 19 and 20 in the commercial store prescriptions show a surprising number of new ingredients required, 47 and 40, respectively, so further explanation should be made. The 1000 prescriptions in these two blocks were taken from a chain store unit, and due to the wide variety of practice and large number of physicians contributing prescriptions filled by this chain store unit, located in the hub of the metropolitan district of St. Louis, this large number of ingredients appeared for the first time in the prescriptions analyzed. If the last two blocks were eliminated due to the unusual factors just mentioned the 9000 remaining commercial type store prescriptions would require only 34 more ingredients than the first 9000 professional store prescriptions.

There is more to this study than meets the eye, and it would be remiss not to state that of the 1274 ingredients that occurred in the 10,000 prescriptions filled in the commercial type stores 17 per cent were chemicals, 46 per cent were galenicals and 37 per cent specialties. Chemicals were minor offenders and in the emergence of new ingredients shown in Table XXXIII had a tendency to emerge in fewer numbers in each succeeding block than either galenicals or specialties. As a matter of fact it was not necessary to purchase any new chemicals at all in the 16th and 17th

(Continued on page 894)

[illegible]





(Continued from page 891)

blocks, and only twenty new chemicals at an average value of \$0.57 each for the 1500 prescriptions contained in the 18th, 19th and 20th blocks. On the other hand, it was necessary to purchase 62 new galenicals at an average cost of \$0.88 each, and 61 new specialties at an average cost in excess of \$1 each for the 2500 prescriptions contained in the last 5 blocks of prescriptions enumerated.

It might be mentioned that narcotic prescriptions were distributed proportionately through each group of 10,000 prescriptions, so that no block was distorted because of this type of prescription.

This study shows quite clearly the prescription department inventory problem of the pharmacist whether he conducts a professional or commercial type drug store as he must continually stock new ingredients some of which may have little call. In addition to this many items, particularly emergency items, must be stocked in anticipation of a rare call.

#### ACTUAL INVENTORY SUMMARY OF THE PRESCRIPTION DEPARTMENT OF A COMMERCIAL TYPE PHARMACY

(See Table XXXIV on pages 892 and 893)

At the time of the preparation of this manuscript the inventory analysis of one of the commercial type survey stores No. 6 B, has been completed and a summary is inserted herewith in order to give the picture of the actual inventory problems of a drug store. Store 6 B is a well managed, fairly modern store and yet is faced, as are most druggists, with the problem of an over crowded prescription department inventory containing many "dead" items. During the survey test year, from May 1, 1931 to May 1, 1932, Store 6 B filled a total of 4013 regular prescriptions with a sales volume of \$3552.75 and 848 liquor prescriptions with a sales volume of \$2332. The total sales volume of this prescription department was \$7042.04, for in addition to the sales from regular and liquor prescriptions, non prescription sales of bulk remedies brought in \$284.44, sales of specialties amounted to \$810.85, and sales of biologicals aggregated \$62. Yet this prescription department would have shown a loss for the survey year had not the net profit on liquor overcome the loss realized on regular prescriptions.

As will be seen in the following table there were 1451 different items in the prescription department inventory of Store 6 B. Yet it has been shown earlier in this chapter that only 1274 different ingredients were required in filling 10,000 prescriptions from commercial type drug stores, almost  $2\frac{1}{2}$  times as many prescriptions as Store 6 B filled in a year. No wonder, then that there were 513 items (35.4 per cent of the 1451 items stocked) which showed no movement at all or purchase from the supply source during the survey year. The same quantities of these 513 items were on the shelves at the end of the survey year as when inventoried at the beginning of the Survey. These items had undoubtedly been ordered to meet the demand of a prescription in an earlier year, for which there was little or no later call.

This analysis certainly gives a vivid actual picture of the problem mentioned earlier in the chapter where methods of simplifying inventory is discussed. This pharmacist's shelves are cluttered with many 'dead' items as the result of many prescriptions calling for little used ingredients. Furthermore the fact that the regular prescription business of this store showed a loss portrays the seriousness of this situation from a monetary standpoint.

In addition to the 513 'dead' items mentioned above, this pharmacist ordered 37 new ingredients when there was no prescription requiring that he do so. These 37 ingredients had no call and joined the rest of the 'shelf-warmers'. Of the 513 items with no movement and purchase, 78 valued at \$20.76 were chemicals, 241 valued at \$131.28 were galenicals and 128 worth \$114.61 were specialties.

There is no need of writing elaborate text on this table as it is self explanatory, and shows the results for the different types of ingredients quite in detail. It might be mentioned that there were 530 items which had both movement and purchase from the supply source. There were 371 other items which had movement, but which were not replenished during the Survey, and 120 of these items were discontinued. The total inventory, consisting of 1451 different items was valued \$908.70 an amount considerably greater than the amount suggested for a store's opening order elsewhere in the report probably due to the accumulation of many items of infrequent occurrence.

Biologicals are seldom prescribed so it is particularly interesting to note the extent of their movement. It should be kept in mind that these results are just for one particular store.

Preliminary inventory tabulations for Store 3 B show a much larger movement of biologicals in that store than in Store 6-B

The information presented in this table should be studied in conjunction with the earlier table in Chapter III showing the average cost of ingredients and prices of prescriptions in Store 6 B, and with the lists of leading ingredients printed in Chapter VII

## CHAPTER VI SIMPLIFICATION OF THE PRESCRIPTION DEPARTMENT INVENTORY

Because of the large number of different ingredients required in filling prescriptions, such a large proportion of which merely become 'shelf warmers' it is certainly to the interest of the pharmacist to take steps to keep the number of items at as low a figure as possible, whenever this can be done without a violation of professional prerogatives and duty

The first step in most drug stores should be to get rid of the large number of items which have long been on the shelves without call. This 'housecleaning' would not include items of an emergency character which are kept in anticipation of a rare call, but would be aimed at obsolete manufacturers' specialties, numerous fluids, extracts and galenicals and similar items which have fallen into disuse but which most druggists seem never to discard, reinventorying them year after year. These 'shelf warmers' might profitably be destroyed, exchanged or contributed to a charitable institution. Druggists might well emulate the policy of a nationally known pharmacist who has created what he styles the 'morgue'. This is a chest or cupboard in which he places at intervals items which have not been prescribed for a year. A loose leaf alphabetical list is kept of these items so that he can immediately place his hands on one of these obsolete items if he should receive a call for it. At the same time, the shelves in his prescription room present an orderly, tidy and not crowded appearance, facilitating the rapid filling of prescriptions and decreasing the chances of inaccuracy. The adoption of this method by druggists throughout the country is recommended, and it is believed that the improved appearance of prescription rooms will favorably impress physicians, with a resulting increase in the prescription business of those stores which clean out their shelves in this way.

While from the theoretical point of view it would be a good thing for the pharmacist to turn down prescriptions containing a rare item which will probably not be called for again and which is destined to become a 'shelf warmer,' many pharmacists would say that from the practical point of view this cannot be done—that customers do not understand the business reasons of the pharmacist in turning down such a prescription and that such a policy would undoubtedly hurt the reputation of the store.

Three methods of handling this problem suggest themselves, where the size of the town and the number of drug stores permit. The first method is for the pharmacist to accept all prescriptions calling for an ingredient of rare occurrence but to have an arrangement with the drug store doing the biggest prescription business in the town, preferably a professional pharmacy, to fill such prescriptions for them and allow a discount. Another method would be for a group of pharmacists to appoint one of their number to handle the type of prescription under discussion, filling the more staple and emergency items themselves. The third method would be for a group of pharmacists to employ their own pharmacist, naturally the most expert possible, and share the expense of a centrally located store. This store would not need to be in a ground floor room, so the expense could be kept at a low figure. Any of the three methods would eliminate the trouble and expense incident to the attempt to fill prescriptions calling for rarely used ingredients, at the same time avoiding any risk of losing professional prestige and reputation by refusing to accept such prescriptions.

However, if a pharmacist is unable to adopt one of the methods suggested above and yet feels that he must do something to prevent the accumulation of many 'dead' items on his shelves, about the only two courses open to him are to refuse to fill certain prescriptions and to contact his leading physicians with a view to obtaining their cooperation in the matter. But in selecting the type of prescription to be turned down, the pharmacist will find the number extremely limited due to various reasons. He will naturally want to eliminate only those items which occur very infrequently and are not of an emergency nature. But often an ingredient occurring just once is prescribed with other ingredients which are comparatively fast movers. If the druggist turns down this prescription in order to avoid purchasing a quantity of the unusual ingredient for which

he has had no previous call he will also have to turn down a chance to use the faster moving ingredients Yet it is quite possible that a large part of the supply of the unusual ingredient even if ordered in the smallest quantity, will lie unused on the shelves

Only in the case where the unusual ingredient is called for in a single ingredient prescription does the problem become relatively more simple If the prescription calls for only a part of the quantity which must be ordered, the pharmacist may turn it down to avoid adding this additional item to his stock of prescription ingredients But even in this case the pharmacist must consider whether or not he is refusing a service to a regular customer which might cost more than the saving accruing from the refusal to make this investment He must also consider the fact that this prescription might be refilled one or more times, which would make it profitable in the end

After all, it is hard to judge in advance whether or not the new ingredient will be called for just a single time It might for example, turn out to be an ingredient which a particular doctor, who sent considerable business to the store had recently found to be applicable in treating certain cases and thus this new ingredient might later be prescribed quite frequently by this particular physician The pharmacist will always be willing to go to extra effort and expense to take care of the unusual demands of regular customers, both physicians and patients

A sample of 1950 prescriptions from commercial type Store No 4 were studied to give an actual example of the possibilities of elimination of prescription department items The 1950 prescriptions required 604 different ingredients, of which 244 or 40.6 per cent, occurred only one time Eliminating those ingredients which were called for in combination with a faster moving ingredient, it was found that 134 of the 244 ingredients which were prescribed just once each were not prescribed in combination with other ingredients The investment required in purchasing the usual quantity of each of these 134 ingredients was found to total \$131.10 The table below gives a summary of the investigation of the 134 ingredients which occurred just one time each, and on single ingredient prescriptions

TABLE XXXV

Type of Ingredient	Number of Ingredients	Per Cent of Total	Total Investment Required	Average Investment per Ingredient
Chemicals	9	6.7	\$ 4.84	\$0.54
Galenicals	37	27.6	36.00	0.97
Specialties	88	65.7	90.26	1.03
Total	134	100.0	\$131.10	\$0.98

Thus it will be seen that a considerable investment is required in filling these 134 prescriptions which occurred just once among the 1700 prescriptions studied While these 134 ingredients lend themselves best to any attempt to keep down the number of prescription department items, yet even with these ingredients there are many factors to be considered before refusing the prescription as outlined above Store 4 fills about 7900 prescriptions annually at an average price of \$1 Thus the average investment in these 'shelf warmers' almost equals the average retail prescription price It is striking to note that 244 'dead' items were called for in prescriptions which amounted to only about one quarter of a year's prescription business

Thus, while there are undoubtedly instances where a prescription calling for an ingredient of rare occurrence may well be turned down yet this will not greatly reduce the number of prescription items required in filling prescriptions However, any effort to keep the number of prescription items at a low figure, if exerted on a systematic and thoughtful basis should be of assistance in the pharmacist's attempt to increase the profit possibilities of the prescription department

It would seem that the most practical way to approach this problem would be to go to the source and obtain the cooperation of the physicians who write the prescriptions It is believed that physicians are interested in decreasing the cost of medical care, and should be glad to cooperate with the druggist if they are individually and collectively made aware of their tendency to write for so many ingredients that are rarely prescribed, when another ingredient of more popular use would serve the same purpose

As seen in the case of Store 4 the bulk of these "shelf warmers" were manufacturers' specialties, which the physician probably had recently heard of, thought he'd try, written a prescription for and then promptly forgotten. If the physician realized the expense involved he would probably be glad to eliminate this wasteful practice to a great extent calling for rare ingredients only when there was a real necessity that they be prescribed.

The pharmacists' associations could get in touch with physicians' associations in bringing this suggested reform to the attention of physicians collectively. However the individual pharmacist can also take steps by contacting his leading physicians. Chapter IV showed that a major share of the total prescription business of most stores consists of prescriptions written by just a few physicians. In professional Store A the leading 25 (out of 463) physicians wrote 56.4 per cent of the prescriptions studied, while in professional Store B 25 (out of 259) physicians wrote 65.8 per cent of the prescriptions studied. The same situation was found to exist in the commercial type drug stores, as reported in the first prescription department report from this survey. Thus, the pharmacist should be able to accomplish a great deal in his effort to simplify the prescription department inventory by maintaining closer contact and cooperation with his leading doctors. Through this contact the pharmacist can also determine the physician's preferences and be ready to supply whatever he prescribes. This should be particularly helpful in the selection of the brands to be carried. Besides cutting down the call for "new" ingredients the pharmacist would also be better informed as to the extent to which a "new" ingredient, if called for, would be used in the future. (See the latter part of this chapter wherein is suggested a method by which the pharmacist may be kept informed of new manufacturers' specialties as they are put on the market.)

Pharmacists generally take inventory at considerable expense each year for tax purposes, and then file away the inventory list and forget about it. The inventory list could be put to practical use by checking it against the previous year's list to weed out "dead" items which have shown no movement during the year.

It has just been seen above that 65.7 per cent of the 134 prescription items occurring just once were manufacturers' specialties. The largest part of the many items on the pharmacists' prescription shelves are specialties many of which are prescribed just once or a few times. The average number of times that each specialty ingredient is prescribed in 20,000 prescriptions as reported in Table XXVIII is 12.8, while chemical ingredients were called for an average of 80.8 times each. In filling the 20,000 prescriptions, 745 different specialty ingredients were prescribed but only 280 different chemical ingredients were called for. Manufacturers interested in the welfare of the pharmacist should mutually take cognizance of this condition, and while naturally continuing to market any new product possessing originality and being an actual contribution to the existing therapeutic agents, should endeavor to resist the temptation of duplicating the already too extensive number of medicinal products now available.

The questionnaire stores with their average inventory investment of \$9255 reported in all but four instances that they did not frequently receive prescriptions calling for items not stocked. All of these stores reported that the items not in stock were new manufacturers' specialties.

#### INTRODUCTION OF NEW MANUFACTURERS' SPECIALTIES

Throughout this text reference has been made to the large number of specialties on the market and being placed on the market each year. The major portion of the pharmacist's inventory problem in the prescription department has been shown to be due to many specialties which are prescribed just once or a very few times in the course of a year. It is certainly of interest to know to what extent these new remedies are introduced each year. Therefore, a study was made of the recent remedies reported in the *Annual Recapitulation of Recent Remedies* in *The American Druggist*, October issues of 1928, 1929, 1930 and 1931. It is possible that there were some new specialties which were not included in the tabulations of *The American Druggist*, but at least the number shown is not an overstatement of the situation.

It was found that during the four years mentioned, 495 new remedies were introduced. The 495 new specialties were divided as follows among the different years: 1928, 103 new remedies, 1929, 126 remedies, 1930, 134 remedies, 1931, 122 remedies, and 10 new products which were put on the market during the period, but as to which the exact year is unknown.

In some cases a remedy was put out in more than one form, such as, for example liquid and powder. If each form is considered as a different new remedy, there were 566 new remedies introduced during the four year period. Throughout the remainder of this section, the number of new remedies will be considered as 566, each form of a new remedy being considered as an additional item.

It was only possible to determine the name of the manufacturer in 520 of the 566 cases. However these 520 new remedies were introduced by a total of 158 different manufacturers. In 40 of the cases where the manufacturer was unknown it was at least possible to determine the firms which marketed the products. These 40 new remedies were marketed by 27 different firms. In the other 6 cases it was not possible to determine either the manufacturer or the firm which marketed the product.

It was found that a small number of manufacturers was responsible for a large proportion of the new remedies introduced. Of the 158 known manufacturers 22 introduced 7 or more new remedies each during the four year period. 2 manufacturers introducing as many as 36 new products each. In all, these 22 manufacturers introduced 306 new products or 54.1 per cent of the 566 new remedies put on the market. Of the 22 manufacturers which led in the introduction of new products, 6 were foreign firms and 16 were domestic corporations. Most of the 22 manufacturers are among the best known pharmaceutical manufacturers.

The table below shows the form of the 566 new remedies. This is interesting in determining whether or not the liquid form is being replaced in part by other forms, such as tablets and capsules. The section in this report which shows the form of the 8670 professional store prescriptions filled in 1930 shows that 52.65 per cent of those prescriptions were liquids, whereas in 1910 and 1920 liquids represented about 64 per cent of the prescriptions studied. However, in approximately 24,000 prescriptions filled by commercial type drug stores in 1930, 61.3 per cent were liquids. Tablets showed a steady increase from 5.9 per cent in 1910 to 13.5 per cent in 1930 in the professional store prescriptions. It is interesting to note therefore, that only 30.4 per cent of the recently introduced products were liquids, while 21 per cent were tablets. There was only 1 ampul prescription among the 8670 professional store prescriptions studied, and yet 71 of the new remedies were in ampul form. Only 5 per cent of the new specialties were capsules.

Of course, the introduction of new remedies does not necessarily mean that they will enjoy a large sale. Therefore the fact that these 566 new remedies have a much smaller proportion of liquids and larger proportion of tablets does not necessarily indicate that the proportion of liquids in prescriptions will be greatly reduced. But it does give a definite picture of the trend as far as the introduction of new specialties is concerned. In line with this thought it is interesting to see the extent to which these new remedies are adopted by physicians. In approximately 35,000 prescriptions filled by professional and commercial type pharmacies in St. Louis Mo., during the 12 month period from May 1, 1930 to May 1, 1931, only 22 (17.5 per cent) of the 126 new remedies marketed in 1929 appeared at all. Of the 134 new remedies introduced in 1930, only 17 (12.7 per cent) were prescribed in the 35,000 prescriptions. Of the 122 new specialties marketed in 1931 only 12 (9.8 per cent) appeared in the prescriptions studied. If the St. Louis situation can be said to be typical of the whole United States we can then assume that on an average only 13.4 per cent of the new proprietaries being marketed are prescribed to any extent.

It should be mentioned, however, that new specialties are more likely to be found on the shelves of the professional pharmacy than in the commercial type drug store. Proprietors of three professional pharmacies in St. Louis were each asked to give a list of their leading specialties. Thus a list of 43 specialties was obtained, all of which were prominent in at least one professional store. The inventories of 11 commercial type stores were then examined and it was found that 24 of the 43 specialties did not appear in any of the 11 stores, while 8 specialties appeared in only 1 store each. Only 4 of the 43 specialties appeared in more than 4 of the 11 commercial type drug stores and none of them appeared in all 11 stores. The manufacturer must, therefore depend on the professional pharmacy to a large extent when marketing a new product. Nearly three fourths of the 35,000 prescriptions examined to find the occurrence of the 566 new remedies were filled in commercial type drug stores. Had prescriptions from professional pharmacies only been searched, a more favorable showing for the 566 new remedies might have re-

sulted. However, the prescriptions examined did include several thousand prescriptions from professional stores.

In view of the above showing it might again be said that manufacturers who have the interests of the pharmacist at heart and who wish to reduce where possible the cost of medical care, have a real opportunity to be of practical assistance by refraining from introducing new specialties which merely duplicate the remedies already on the market and which are not an actual contribution to the existing therapeutic agents.

TABLE XXXVI—FORM OF NEW MANUFACTURERS' SPECIALTIES INTRODUCED IN 1928, 1929, 1930 AND 1931

Form of Remedy	Number of New Remedies	Per Cent of Total
Liquids (Including Solutions)	172	30.4
Tablets	119	21.0
Powders	76	13.4
Ampuls	71	12.6
Creams, Jelly, Salve or Ointment	41	7.2
Pills, Pearls, etc.	33	5.8
Capsules	28	5.0
Unknown	26	4.6
Total	566	100.0

#### SPECIALTY CAPSULE PRESCRIPTIONS

It is interesting to see what percentage of the capsule prescriptions studied were manufacturers' specialties. Out of a total of 1258 nonnarcotic capsule prescriptions filled in professional Stores A and B, 167 or 13.3 per cent were manufacturers' specialties. Both stores were quite close to this average percentage. In Store A 12.2 per cent of the nonnarcotic capsule prescriptions were specialties, while this was true of 14.9 per cent of Store B's nonnarcotic capsule prescriptions. Store A filled 768 nonnarcotic capsule prescriptions and Store B only 490. This finding comes as a surprise particularly in view of the showing in the preceding table to the effect that only 5 per cent of the new specialties introduced in the four years from 1928 through 1932 were capsules.

#### METHOD OF FILING INFORMATION ON SPECIALTIES

The conduct of the prescription phase of the survey has brought to light a condition which the specialty manufacturer will probably appreciate being brought to his attention, and that is the scarcity of convenient information and reference to the numerous existing specialties. This inconvenience is not felt so much by the professional pharmacies which have a large enough turnover in the items to be familiar with them, but it is a decided problem to the majority of the 60,000 retail pharmacists who while only filling around 10 prescriptions a day each nevertheless feel called upon to have at their finger tips for themselves and physician patrons detailed information regarding the name, price, form or forms, active ingredients and therapeutic action of the manufacturer's specialty.

It is true that some manufacturers announce the introduction of any new product in trade journals or their individual house organs, but with the multiplicity of tasks which confront the average pharmacist he does not always have time to scan and file this material. Furthermore, there is no uniformity in size of this literature, nor does he often receive a prescription calling for a specialty simultaneous with the receipt of its announcement in a house organ or a trade journal. It might be argued that upon the receipt of a prescription calling for a specialty with which he is not familiar the pharmacist can run through his literature and see if he could not locate it. Obviously this is not expedient. Or it might be suggested that he consult one of the trade directories with which he is furnished when he subscribes to a trade journal. Many reasons might be stated why this is often not productive of results. One such reason, and an important one from the manufacturers' viewpoint, is that even if he succeeded in locating the specialty in a trade journal the information would give him only the price, the name of the product and the

name of the manufacturer but would fail to give him any information regarding its form or forms its composition and its therapeutic effect, and not infrequently the druggist is asked these very questions by a physician. He is thus placed in an unfavorable light in the eyes of the physician, or perhaps the physician writes a prescription for another ingredient which the pharmacist has readily available, in which case all the time and expense to which the manufacturer has gone in detailing the physician is lost.

Proprietors of drug stores interviewed during the conduct of the survey suggested that both manufacturers and pharmacists would mutually benefit, if all of the pharmaceutical specialty manufacturers would join in designing a uniform size card approximately the size of a post card or smaller upon which would be printed the essential details regarding any new trade named specialty which they contemplated introducing. The method for distributing this card to the pharmacist could be through several mediums such as for example, in an envelope under one cent postage or through one of the national retail druggist associations, such as the AMERICAN PHARMACEUTICAL ASSOCIATION or the National Association of Retail Druggists, or through the medium of the wholesaler. Numerous other methods will suggest themselves. The entertainment of the suggestion should include a consideration of a suitable case or box into which the cards could be filed. It is not believed that the expense of such an undertaking would be disproportionate to the benefit to be derived by all concerned and it would seem to coordinate with the manufacturer's detailing programs.

This suggestion was first made by one of the authors of this report in an address before the American Pharmaceutical Manufacturers Association at Greensboro, N. C. on May 17, 1932, shortly after the first report on the prescription phase of the National Drug Store Survey was published. It is gratifying to learn that one of the trade journals has endorsed the suggestion and is going even further by making a practical application of the plan. Each month the *Druggists Circular* publishes full information concerning new manufacturers' specialties which have just been introduced. This information is published in convenient form, so that it can be clipped and pasted on 3" by 5" index cards, and placed in a file box for instant reference. The *Druggists Circular* reports a hearty response to the plan as indicated by letters from pharmacists located in all sections of the country.

Since the inauguration of this information system the *Druggists Circular* has described 63 of the newer trade marked pharmaceutical specialties only 2 of which are found among the 253 leading specialties described in the ingredient analysis of 20 000 prescriptions, presented later in this report. The fact that such a large number of new specialties have been introduced in such a short time shows the need for such information. If the publishers of this information would go a step further and publish a list of from 200 to 300 new specialties introduced in the last several years, such as those mentioned in another section of this report, they can give their readers even greater service.

The pharmacist's references at present include such textbooks and books of standards as the United States Pharmacopoeia, the National Formulary, New and Nonofficial Remedies and a dispensatory. The execution of the plan outlined above would fill the gap and complete the sources of information to which the pharmacist could refer when seeking information regarding a prescription ingredient.

#### SPECIFICATION OF GALENICALS OF PARTICULAR MANUFACTURE

As seen in Table XXVIII 436 different galenicals used in filling 10 000 prescriptions in professional drug stores were used a total of 5455 times. In only 327 out of the 5455 times that galenicals were called for or about 1 out of each 17 times, was a particular manufacturer specified by the prescribing physician. Prescriptions filled by Store A had 171 such specifications, and Store B 156.

Galenicals, as used in this report, may be defined as preparations such as elixirs, fluid extracts, tablet triturates, certain organotherapeutics, concentrates, products in extract or other form, etc. which are of a competitive character, and which do not have distinctive trade names which would identify them as the exclusive product of a specific manufacturer.

The fact that there is so little specification of particular brands will be welcomed by the wholesaler and retailer who are interested in stock simplification and in keeping down to a minimum the investment in the prescription department inventory. On the other hand, it will not



be so cheerfully received by pharmaceutical manufacturers who are devoting considerable money and effort to have physicians specify their brand name when prescribing galenicals. One of the complaints most frequently voiced by pharmacists during the survey was the fact that brand specification of galenicals required them to carry from three to five brands of the same galenical such as Viosterol and Haliver Oil, detracting from the profit possibilities of the prescription department.

#### EXTENT OF MANUFACTURING IN THE PHARMACY

Inquiry in the four professional pharmacies disclosed the fact that a considerable amount of manufacturing of galenicals and other preparations takes place in the professional pharmacy. Eight registered graduates are employed at Store A and one of these has charge of the manufacturing which requires about half his time as prescription clerk. This prescription clerk is paid the highest salary. Separate space is set aside for the manufacturing function. Inasmuch as all of the clerks are necessary and no relief clerks are required, the proprietor estimates a saving of 20 per cent on preparations manufactured. Among the principal items manufactured in the store are Camphorated Tincture Opium, Elixir Iron Quinine and Strychnine, Spirit of Camphor Compound, Elixir Glycerophosphates, Syrup Ferrous Iron, Ointment of Rose Water and all simple U S P and N F preparations.

In Store B about the same situation exists. This store employs six registered graduates, one of whom does all of the manufacturing which consumes about half of his time. The items manufactured are similar to those in Store A and the estimated savings about the same as in Store A.

In Store C about 50 per cent of the galenicals and other such preparations are manufactured in the store. This work is assigned to a particular clerk and requires from two to three hours of his time daily. The saving due to this store's manufacturing is estimated at 25 per cent. Among the leading preparations so manufactured in this store are Elixir of Terpin Hydrate, Elixir of Three Bromides, Compound Elixir of Glycerophosphates, Syrup of Hypophosphites, Syrup of Calcium Lactophosphate, Elixir of Ammonium Valerate, Syrup of Ferrous Iodide and Solution of Iron Peptonate and Manganese.

In Store D all galenicals are manufactured when practical but if they require an assay or if for some other such reason it is not practical to manufacture them, they are not manufactured in the store. This manufacturing is assigned to one clerk and requires about 50 per cent of his time. The proprietor considers the time profitably spent but has never estimated the savings. Among the leading preparations so manufactured in Store D are Antiseptic Solution, Tincture of Iodine, Lugol's Solution, Elixir Phenobarbital, Compound Syrup of Hypophosphites, Syrup Ferrous Iodide, Syrup of Tolu and Syrup of Wild Cherry.

All but two of the questionnaire stores manufactured galenicals and other preparations as much as possible and this manufacturing was believed to be profitable in all but four of the cases.

*(To be concluded in October issue of the JOURNAL)*

#### ANOTHER TRI STATE ASSOCIATION MEETING PLANNED

The Pharmaceutical Associations of Arizona, New Mexico and West Texas held a joint meeting at El Paso in May of 1932 and had such a good time that they are planning to repeat the experience in 1935. Emissaries of El Paso came to the Carlsbad meeting of the New Mexico Association and extended an invitation which was accepted contingent upon similar acceptance by the Arizona and West Texas associations. Jack Robinson and L. Evans, Jr., both of Phoenix, Ariz. were present and expressed their belief that their state would be enthusiastic over the idea and it is a foregone

conclusion that West Texas will get behind the movement. It is hoped not only to get the druggists of these states together but also to secure attendance from other states in the great West including Colorado, Kansas and Oklahoma.—*Rocky Mountain Druggist*

*Chinnum*—The Bureau for Promoting the Use of Quinine has published a booklet on "Quinine in General Medical Practice." It is a supplement in a way to the volume published in 1930 and edited by Dr. Fritz Johannesohn. Accompanying the volume is a smaller booklet on *Formulas* in which quinine is represented.

# ASSOCIATION BUSINESS

THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, 1932-1933

Office of the Secretary, 10 West Chase Street Baltimore Md

LETTER NO 11

August 28, 1933

*To the Members of the Council*

The Second Meeting of the Council for 1932-1933 was held in the Hotel Loraine, Madison, Wisconsin, on Monday, August 28, 1933, beginning at 9 30 A M, with the following members present Hilton, Arny, Bradley, Day, Caspari Philip, Slocum, Eberle, DuMez and Kelly

*80 Committee on Finance* The following report was read by Chairman Bradley

' With such competent and devoted financial officers as Secretary Kelly and Treasurer Holton the work of the Committee on Finance is not arduous, but it is responsible and requires considerable attention by the chairman The routine inspection of all bills, before they are paid, must be attended to, and the preparation of the annual financial budget requires careful study and considerable work This was especially important this year, because of the reduced income due to the depression when so many other organizations are involved in serious financial difficulties Such difficulties constitute a conclusive test of the soundness of the policies and operation of an organization and it is a pleasure to report that our ASSOCIATION is showing its soundness in the fine way it is weathering the storm

'After paying careful attention to the finances of the ASSOCIATION for several years, we believe the ASSOCIATION to be in an entirely sound condition Detailed information on financial matters is not given here as it is contained in the carefully prepared and audited reports of the secretary and the treasurer presented at this meeting and at the end of the calendar year The Committee on Finance has been doing its best to help the officers to keep the expenditures within the receipts and we believe this will be accomplished "

After a general discussion of the finances of the ASSOCIATION, the report was accepted on motion of Day, seconded by Arny and carried

*81 Committee on Property and Funds* Chairman Philip read the following report

' In accordance with Article VI of Chapter IV of the By-Laws of the Council, the Committee on Property and Funds submits its report The Committee recommends to the Council the following banks and safe deposit vaults

## DEPOSITORIES FOR FUNDS

The Baltimore Trust Company, Baltimore, Md  
The Baltimore National Bank, Baltimore, Md  
The Maryland Trust Company Baltimore, Md  
The Merchants and Newark Trust Company, Newark, N J  
The Boston Penny Savings Bank Boston, Mass

## DEPOSITORIES FOR SECURITIES AND RECORDS

The Baltimore National Bank Baltimore, Md—Safe Deposit Boxes  
The Maryland Trust Company Baltimore Md—Safe Deposit Boxes  
The Merchants and Newark Trust Co, Newark, N J—Safe Deposit Boxes

' The Committee is pleased to report that interest has been paid on all securities owned by the ASSOCIATION with one exception Interest on a \$1000 bond of the City of Detroit owned by the Life Membership Fund and amounting to \$40 00 has not been paid and no information is available just now as to when interest will be paid

' The \$275,000 U S Treasury bonds, 3% owned by the Headquarters Building Fund advanced in value to 98 1/2 at which price they were sold in accordance with the best advice that the officers could obtain As they were bought at par this sale represented a loss of \$4125 which

loss was more than made up by the savings on the building and interest saved on the bills for the building work and supplies

'The treasurer is keeping a strict account of all investments for the Headquarters Building and property. The amount to June 30 1933 was \$422 624 19

No action has been taken with respect to the Franklin M. Apple Fund referred to in the report of the Committee last year and which amounts to \$1607 05. The chairman of the Council, the secretary and the treasurer were appointed a committee to consider the most appropriate means of recognizing the generosity of Mr. Apple and his splendid support of the Association, and the final disposition of the fund. Until the Headquarters Building is nearer completion the committee can make no recommendation to the Council.

As the treasurer will report, the Merchants and Newark Trust Company and the Boston Penny Savings Bank in which the checking and savings accounts of the Association are kept, and the Maryland Trust Company in which the Headquarters Building funds are deposited, opened on a full basis after the bank holiday. The Baltimore Trust Company in which the secretary's account and the cash balances of the various funds are deposited, opened on a restricted basis and has since been reorganized as the Baltimore National Bank. How fully and rapidly the accounts will be paid by liquidation cannot be predicted. No other course than to cooperate is possible and in the meantime the balances draw interest at 2%.

'On the whole, the Association has come through the year very satisfactorily so far as its property and funds are concerned and no changes are recommended.

On motion of Day, seconded by Caspari and carried, the report was received and the recommendation approved.

**82. Standard Program.** Chairman Hilton made a verbal report for the Committee, explaining the principal modifications made in the program of the 81st meeting. The report was received.

**83. Committee on Recipe Book.** In the absence of Chairman Lascoff the following report was read by the secretary:

'Your Chairman begs to submit the following report on the Recipe Book for the year 1932-1933:

During the past year circulars were distributed. As per the report of Dr. Kelly, up to June 1 1933 93 books were distributed complimentary. 4487 have been sold and 420 are in stock. Since June 1st, your chairman has received several requests for books and orders have been filled by Lippincott and Company.

The Committee is very anxious to revise this AMERICAN PHARMACEUTICAL ASSOCIATION Recipe Book and to have the second edition in print. However, this cannot be done until the N. F. is completed.

In this connection, may I state that five bulletins have already been sent out to the members of the Committee.

On March 16th Bulletin Number 1 was sent out.

Up to the present writing twenty replies have been received from the twenty-four members of the Committee.

On the date of July 26 1933, I received a letter from Dr. Gathercoal, chairman of the National Formulary Committee, accompanied by a list of deletions and tentative deletions. The letter reads in part, as follows:

'There is also inclosed pages 794-819 of the N. F. Bulletin showing the copy practically complete for the chapter which will be found in the N. F. on Diagnostic Reagents and Chemical Tests. You will note that this contains a good many formulas for staining solutions. I think all of these will be included in the N. F. and I trust that you will be careful not to duplicate them in the Recipe Book. There is also included a single page, 873, showing the Dental Preparations that have been approved for admission to the N. F. VI and those that have been refused admission to N. F. VI from N. F. V. These should not be duplicated in the Recipe Book.

I think your plan for the several bulletins to the Recipe Book Committee is a very good one and the features that you mention should make the Recipe Book more popular.

'I forgot to state that quite a good many ampuls have been admitted to N F VI. A list of these is inclosed, pages 25-26 of Sub Committee No. 8. I trust that you will not duplicate these titles in the Recipe Book.'

Permit me to state, that all precautions will be taken that no items which will appear in the National Formulary will be in the Second Edition of the Recipe Book.

The list of deletions follows

Acet Arom	Fldext Kav
Cerat Camph	Fldext Kol
Chart Pot Nit	Fldext Lupulin
Collod Bitum Sulphon	Fldext Manac
Confect Ros	Fldext Matic
Confect Senn	Fldext Mezer
Elx Casc Sagr Co	Fldext Pareir
Elx Cathart Co	Fldext Querc
Elx Chlorid	Fldext Rubi
Elx Cinchon Ferr et Bism	Fldext Rumic
Elx Cinchon Ferr et Strych	Fldext Scopar
Elx Cinchon Ferr Bism et Strych	Fldext Scutellar
Elx Coryd Co	Fldext Senecion
Elx Gent et Ferr Phos	Fldext Solan
Elx Guar	Fldext Thuj
Elx Hydrast Co	Fldext Tong
Elx Manac Co	Fldext Verbasc Fol
Elx Phosphor et Nuc Vom	Fldglycer Casc Sagr
Emp Fusc Camph	Fldglycer Glycyrrhiz
Emp Sapon	Fldglycer Kramer
Emuls Ol Ricin	Fldglycer Rhei
Ext Conu	Garg Guaiac Co
Ext Euonym	Glycer Pic Pin
Ext Ferr Pomat	Glycerogel Acid Salicyl
Ext Hæmatox	Glycerogel Iodof
Ext Ignat	Glycerogel Zinc Dur
Ext Kramer	Glycerogel Zinc Mol
Fldext Angel Rad	Gossyp Stypt
Fldext Aral	Inf Brayer
Fldext Asclep	Inf Ros Co
Fldext Aven Sativ	Inunct Menthol
Fldext Baptis	Lac Ferment
Fldext Boldi	Liq Opii Co
Fldext Chmaph	Liq Aur Brom et Arsen
Fldext Churat	Liq Bism
Fldext Cocillan	Liq Chlor Co
Fldext Coffeæ	Liq Ferr Albumin
Fldext Copt	Liq Ferr Cit
Fldext Corni	Liq Ferr Salicyl
Fldext Corydal	Liq Hydrastin Co
Fldext Cypriped	Liq Iodi Phenol
Fldext Digit	Liq Pancreat
Fldext Droser	Liq Pepsin
Fldext Dulcam	Liq Pepsin Antisept
Fldext Fuci	Liq Pepsin Arom
Fldext Galeg	Liq Phos Acid
Fldext Geran	Liq Phos Co
Fldext Irid Vers	Liq Phosphor
Fldext Jugland	Liq Sod Arsenat

Liq Sod Arsenat Dil	Pulv Arom Rubefac
Lot Ammou Camph	Pulv Crct et Opi Arom
Mass Coparb	Pulv Hydrarg Chlor Mit et Jalap
Mel Ros et Sod Bor	Pulv Myric Co
Mel Sod Bor	Pulv Rhei et Magnes Anis
Mist Adstring	Pulv Talc Co
Mist Chlorof et Morph Co	Sevum Benz
Mist Coparb et Opi	Spec Emoll
Mist Mag Asafoet et Opi	Spec Lax
Mist Ol Balsam	Spec Pect
Mist Opi et Chlorof Co	Spec Sinap
Mist Opi et Rhei Co	Stil Medic
Mucil Sassaf Medul	Stil Acid Salicyl
Mull Ac Salicyl	Sulphur Iod
Mull Creosot Salicyl	Syr Allu
Mull Hydrarg Chlor Corros	Syr Calc Iodid
Mull Zinc	Syr Calc Lactophos et Ferr
Nebul Thymol	Syr Ferr Sacch Sol
Ol Inf	Syr Ficor Co
Oleat Quin	Syr Iodotan
Oleat Veratrin	Syr Kramer
Ol Hyoscy Co	Syr Mann
Oxymel Scill	Syr Phos Co
Past Betanaphth	Syr Phos Quin et Strych
Past Dextrin	Syr Quinid
Past Zinc Sulphur	Syr Rham Cathart
Petrovolina Medicata	Syr Ros
Petrox Betanaphth	Syr Rubi
Petrox Bitum Sulphon	Tr Amar
Petrox Cadinum	Tr Antiperiod s Aloe
Petrox Chlorof Camph	Tr Aromatica
Petrox Eucalyptol	Tr Croc
Petrox Guaiacol	Tr Ferr Chlor Aeth
Petrox Hydrarg	Tr Ferri Pomat
Petrox Iodi Dil	Tr Guaiac Co
Petrox Menthol	Tr Humul
Petrox Methyl Salicyl	Tr Ignat
Petrox Phenol	Tr Jalap Co
Petrox Phenol Camph	Tr Opi Crocat
Petrox Sulphurat	Tr Opi et Gambir Co
Petrox Sulphurat Co	Tr Passiflor
Pil Aloe et Ferr	Tr Rhei Aq
Pil Aloe et Podoph Co	Tr Rhei et Gent
Pil Aloe Hydrarg et Podoph	Tr Sabal et Santal
Pil Antiperiod s Aloe	Tr Sumbul
Pil Fer Quin Aloe et Nuc Vom	Troch Eucalypt Gum
Pil Opi Digit et Quin	Ung Fusc
Pil Opi et Camph	Ung Plumb Iod
Pulv Aloe et Canell	Ung Veratrin
Pulv Antimon	

As stated before on March 16th, I sent out Bulletin Number 1 with a list of 60 Pharmaceutical Formulas

On August 10th the following Bulletins were mailed to the Members of the Committee

Bulletin Number 2 Consists of 16 Pharmaceutical Formulas

Bulletin Number 3 Consists of 15 Formulas for Stains and Reagents

- Bulletin Number 4 Consists of a Table of Doses  
 Bulletin Number 7 Consists of 11 Dental Formulas  
 Bulletin Number 8 Consists of a Questionnaire

A total of 102 Formulas was submitted for consideration besides a Questionnaire and proposed Table of Doses Although many pharmacists are in constant need of this Table of Doses, I do not think that it will be adopted

"Quite a number of the foregoing will appear in our Second Edition However, I am not in favor of permitting the Fluidextracts and Fluidglycerites in the new book Very few pharmacists prepare their own Fluidextracts or Fluidglycerites

'Many comments, suggestions and criticisms have been received to date These will be taken up in their order and duly considered before a final vote is taken on any preparation in question

'On August 1st, I received a letter from Dr Cook asking whether an exhibit of about 30 or more of the most important preparations from the Recipe Book, for which there is a large use in this country at this time, could be prepared in time for this Convention He also requested that a short paper be prepared for the Thursday afternoon session devoted to exhibits This has been done

The idea of the exhibit is, of course, to give prominence to the Book along with the U S P and N F Not enough publicity has been given to the Recipe Book There are many physicians who do prescribe from the U S P and N F They prescribe very little from the Recipe Book for the simple reason that they are not sufficiently acquainted with it because, as I have said before, not enough publicity has been given

'I am taking this opportunity to thank the members of the Committee for their different suggestions and criticisms

I wish to thank Dr Kelly and Editor Eberle for their work in connection with the distribution and sale of the Pamphlets and Books Work on the next Revision is being done very carefully and especial care taken not to repeat the small errors which are wont to crop up

"I also wish to thank once more all of the members of the AMERICAN PHARMACEUTICAL ASSOCIATION who have shown their interest and cooperation in our work in behalf of the AMERICAN PHARMACEUTICAL ASSOCIATION Recipe Book "

The report was accepted on motion of Day, seconded by Army and carried, with thanks and with the suggestion that the proposed table of doses might be included in the index of the second edition

84 *Committee on National Formulary* Chairman Gathercoal read the following report

## REPORT OF THE NATIONAL FORMULARY COMMITTEE

BY E N GATHERCOAL, CHAIRMAN

The National Formulary Committee has vigorously prosecuted the work of the Revision during the past year From August 20 1932 to a similar date in 1933 there have been issued from the Chairman's office 540 mimeographed pages of the N F Bulletin (pages 566-1082 and Index) and approximately 360 mimeographed pages in the several Sub Committee Letters A relatively large correspondence has also been carried on during the year

### ADMISSIONS TO NATIONAL FORMULARY VI

The following tabulation shows the admissions to N F VI as of August 15, 1933 There is almost constant change going on as regards admissions and it is difficult to obtain figures that are truly accurate It will probably be next summer before final results can be published

The trend of admissions to N F VI can now be plainly discerned This trend is to refuse admission to items not being prescribed by physicians and to admit from N F V and from deleted U S P X items and particularly from new items only those that are prescribed by physicians This is illustrated by the fact that of the 305 items in N F V not admitted to N F VI, 291 have no prescription usage and only 15 have occurrences of more than 1 per 10 000 prescriptions Many of these 15 are being reconsidered for admission to N F VI

It is true that we will have in N F VI quite a good many 'pharmaceutical necessities'

4 e, items required for N F preparations, but in themselves are never directly prescribed. This includes many of the crude drugs, some chemicals and many of the fluidextracts. Likewise, there will be present in N F VI quite a number of items, perhaps thirty or forty, that are extensively used by physicians, but that are rarely prescribed by physicians. This includes particularly the ampuls and possibly some biologicals. Finally there is a relatively small group of items that are extensively sold as medicines, but are rather seldom prescribed. This includes such items as Psyllum Seed, Matricaria, Areca, Salicylic Collodion (corn cure), Dentifrice

## IN NATIONAL FORMULARY V

	Items	Occurrences per 10 000 Prescriptions
Part I	565	1519 6
Part II	214	130 0
Total	779	1649 6

## IN NATIONAL FORMULARY VI

N F V items admitted to N F VI	472	1587 5
U S P X items admitted to N F VI	73	281 6
Unofficial items admitted to N F VI	96	838 4
N F V items proposed for N F VI	18	43 6
Unofficial items proposed for N F VI	158	1020 7
Total	641	2707 5

## N F V ITEMS NOT ADMITTED TO N F VI

Part I, 222 items with 40 8 occurrences

Part II, 83 items with 21 3 occurrences

Total, 305 with 62 1 occurrences

It will be of interest to those who are not fully familiar with the details of the National Formulary Committee procedure to know that the entire N F Committee serves as the Committee on Scope. All of the items that have been proposed for admission to N F VI up to August 1, 1933 have been presented to the N F Committee for comment as to their admission to N F VI. It is expected that this phase of the revision work will be culminated by voting within the next two months.

No	Class	Sub Committees	Chairman	Assigned to Sub Com	Number of Monographs Presented to Sub Com	Recom- mended to N F Com	Ready to Print
1	Botanicals		E L Newcomb	106	*	76	
2	Chemicals		G L Jenkins	60	46	45	42
3	Solutions		H A Langenhan	116	104	85	
4	Extractive Preparations		W L Scoville	145	*	88	
5	Solid Preparations		I A Becker	28	26	9	9
6	For External Use		L Saalbach	51	40	22	
7	Miscellaneous Preparations		A B Nichols	50	34	30	19
8	Biologicals		B Fantus	1	0	0	
9	Nomenclature		H V Army				
Special	Dental Preparations		J R Blayney	(10)		(10)	
Special	Tablets		A B Nichols	55	10	0	
Special	Ampuls		B Fantus	29	27	1	
Special	Gland Substance		B Fantus	?			
Totals				641	287	356	70

\* Full monographs not presented to Sub Committees

## SUB COMMITTEE ACHIEVEMENTS

The Sub Committees have been progressing nicely with the details of monograph construction. We frequently view the progress of monograph revision or construction in three stages: *First*, its presentation to the Sub Committee, *second*, its recommendation by the Sub Committee and presentation to the General Committee, *third*, its presentation to the General Chairman as being ready for the printer. Many of the monographs, especially of the new items (ampuls, tablets, glandular substances, etc.) are subject to severe criticism, not only in the Sub Committee, but later in the General Committee and by the interested public. For a large number of copies of the Bulletin are distributed outside of the N F Committee. These criticisms are all carefully considered by the Sub Committee and its chairman and the complete monograph often bears evidence of these criticisms. The foregoing tabulation shows the progress of the Sub Committee work.

## NATIONAL FORMULARY RESEARCH INVESTIGATIONS

A number of research investigations financed by the AMERICAN PHARMACEUTICAL ASSOCIATION and bearing directly in National Formulary revision, have been completed during the past year. These may be briefly described as follows:

*Research on Ampuls*—Dr Bernard Fantus and Dr E B Carter have completed extensive studies on ampul glass, ampul sterilization and on 24 new ampul monographs. These reports have received extensive criticism in the special Sub Committee on Ampuls and part of the material has been presented in the N F Bulletin.

*Research on Pharmaceutical Vehicles*—Dr B Fantus and his associates in the Pharmacology Laboratory of the University of Illinois College of Medicine have completed six papers on vehicle preparations and including the Aromatic Eriodictyon Syrup and Elixir, the Glycyrrhiza Syrup and Elixir, Anise Elixir and Syrup, Cinnamon Syrup, Elixir of Phenobarbital and Elixir of Amidopyrine. They also have work in progress on the Pepsin Elixirs, Acacia Syrup, Raspberry Syrup, other fruit syrups, etc. While it is not possible to describe this work in detail in this short report yet it must be said that the work is having a marked effect on a considerable number of important N F items.

*Research on Tablets*—Professor A B Nichols and Professor L G Cordier are actively at work on tests of identity and purity for the 55 tablet monographs submitted to N F VI. The tolerances and assay processes prepared by the Joint Contact Committees of the American Drug Manufacturers Association and of the American Pharmaceutical Drug Manufacturers' Association, and approved by the national enforcement officials, have been adopted so far as possible by the N F Sub Committee on Tablets, otherwise the preparation of these monographs would have proved to be an impossible task. This same statement could be made regarding the ampul monographs. If the years of work by the Joint Contact Committees regarding tolerances and assays had not been available and freely placed at the disposal of the N F Committee, these monographs would not have been possible.

*Research on Glandular Substances*—A special Sub Committee headed by Dr Fantus and including Dr H W Youngken of Boston and Dr Marvin R Thompson of Baltimore, and Dr F O Taylor, Dr David Klein, Dr Frederic Fenger, Dr James H Hutton, all of Chicago, has been giving special consideration to tolerances and assay methods, histological descriptions and tests of identity and purity for a number of extensively used desiccated glandular substances.

*Research on Extractive Processes*—Dr W J Husa and a number of collaborators have reported monthly during the year on their progress in the study of the scientific principles of extraction. Many interesting and important facts have been presented and the work appears to be progressing nicely and it may be possible even yet to apply in a practical way the results of these extensive investigations to the monographs on extractive preparations in both the U S P and the N F.

## THE PRESCRIPTION INGREDIENT SURVEY

Especial mention should be made of the Prescription Ingredient Survey which was published in book form in June 1933. The work of originating this survey early in 1930, then pushing forward the accumulation of the data and finally of preparing the data with extensive introductory chapters in form for publication has been a very heavy item in the chairman's office and has involved a large item of expense in connection with the N F revision.



There are more than 5000 primary names and about 1200 cross references in the tabulated portion of this publication. On the reports as received from the prescription readers, there were approximately 75,000 hand written names, often synonymic or abbreviated and hurriedly written, and these have been assembled into the 3553 names of ingredients in the U S P—N F Survey (Column G). The other names to make a total of about 5000 are found in the six other surveys that were incorporated into the completed report. Also there were approximately a quarter of a million tally marks on these report forms and these have been added and properly applied to each of the names.

Seventeen rolls of adding machine tape have been used in this work and it is estimated that more than 35,000 arithmetical calculations have been utilized in compiling these tabulations and in converting the numbers in all seven of these surveys to 10,000 prescription basis.

However, this Survey has been of very great value to the N F Committee, as well as to the U S P Committee, and its value will be reflected in N F VI when completed for a real scientific basis of admission has been established. This new basis is a foundation that will materially strengthen the National Formulary in medical circles and among pharmacists and other scientists.

A quantity of material illustrating the development of the Survey has been placed on exhibition during A P H A week at Madison, and we trust that you will be sufficiently interested to give it the "once over."

On motion of Bradley, seconded by Philip, and carried, the report was received with appreciation to Chairman Gathercoal and his associates, including those who worked on the U S P—N F Prescription Ingredient Survey.

**85 Committee on Research.** Chairman Army made a verbal report. Dr Husa's work under the grant of \$1000 made at the Toronto meeting had been splendid and a renewal of the grant for 1933 had already been voted to enable plans to be made for continuing the study of extraction. Dr Husa will present a short account of the work during a general session and a brief summary for publication in the JOURNAL. The final report will be condensed for later publication on account of cost. The report was accepted on motion of Caspari, seconded by Slocum, and carried.

**86 Committee on Student Branches.** Chairman Philip reported verbally that on account of the present conditions, no special effort had been made to establish student branches although he hoped eventually to see one in each college. One branch at the California College of Pharmacy was established during the year. The report was accepted on motion of Day, seconded by Army, and carried.

**87 Committee on Publications.** Chairman DuMez read the following report which was received on motion of Day, seconded by Army, and carried:

Your Committee on Publications respectfully submits the following report on its activities during the past year, and on the status of the ASSOCIATION'S publications:

**Journal.** The total expenditures for the publication of the JOURNAL for 1932, including the editor's salary, were \$19,995.51 (\$14,955.51 + \$5000.00). The total expenditures for 1931 were \$20,364.23 (\$15,364.23 + \$5000.00), which represents a decrease of \$368.72.

The receipts of the JOURNAL for advertising, subscriptions, sale of single copies, reprints, etc. for 1932 were \$8861.37. The subscription credit received for non-headquarters building members less 20% for overhead amounted to \$4718.97, making a total of \$13,580.34. The total receipts for 1931 were \$15,481.67. The receipts have therefore, decreased by \$1901.33.

The total expenditures of \$19,995.51 less the receipts of \$13,580.34 show the net cost of the JOURNAL for the year to be \$6415.17. The net cost for 1931 was \$4882.56. The net cost of the JOURNAL has therefore, increased by \$1532.61 over the preceding year. This increase in cost is due largely to a falling off in membership subscription credits, the falling off amounting to \$1293.69. The decrease in receipts from advertising amounted to \$605.66.

The JOURNAL was again printed and distributed by the Mack Printing Company of Easton, Pa.

Further details relative to the management and publication of the JOURNAL will be presented by Editor Eberle.

**Year Book.** Volume 19 of the YEAR BOOK covering the calendar year 1930 has been distributed. Three thousand copies were ordered and approximately 2500 of these have been distributed.

## SUB-COMMITTEE ACHIEVEMENTS

The Sub Committees have been progressing nicely with the details of monograph construction. We frequently view the progress of monograph revision or construction in three stages: *First* its presentation to the Sub Committee, *second*, its recommendation by the Sub Committee and presentation to the General Committee, *third* its presentation to the General Chairman as being ready for the printer. Many of the monographs, especially of the new items (ampuls, tablets, glandular substances, etc.) are subject to severe criticism, not only in the Sub Committee, but later in the General Committee and by the interested public, for a large number of copies of the Bulletin are distributed outside of the N F Committee. These criticisms are all carefully considered by the Sub Committee and its chairman and the complete monograph often bears evidence of these criticisms. The foregoing tabulation shows the progress of the Sub Committee work.

## NATIONAL FORMULARY RESEARCH INVESTIGATIONS

A number of research investigations, financed by the AMERICAN PHARMACEUTICAL ASSOCIATION and bearing directly in National Formulary revision, have been completed during the past year. These may be briefly described as follows:

*Research on Ampuls*—Dr. Bernard Fantus and Dr. E. B. Carter have completed extensive studies on ampul glass, ampul sterilization and on 24 new ampul monographs. These reports have received extensive criticism in the special Sub Committee on Ampuls and part of the material has been presented in the N F Bulletin.

*Research on Pharmaceutical Vehicles*—Dr. B. Fantus and his associates in the Pharmacology Laboratory of the University of Illinois College of Medicine have completed six papers on vehicle preparations and including the Aromatic Eriodictyon Syrup and Elixir, the Glycyrrhiza Syrup and Elixir, Anise Elixir and Syrup, Cinnamon Syrup, Elixir of Phenobarbital and Elixir of Anisodopyrine. They also have work in progress on the Pepsin Elixirs, Acacia Syrup, Raspberry Syrup, other fruit syrups, etc. While it is not possible to describe this work in detail in this short report, yet it must be said that the work is having a marked effect on a considerable number of important N F items.

*Research on Tablets*—Professor A. B. Nichols and Professor L. G. Corder are actively at work on tests of identity and purity for the 55 tablet monographs submitted to N F VI. The tolerances and assay processes prepared by the Joint Contact Committees of the American Drug Manufacturers Association and of the American Pharmaceutical Drug Manufacturers Association and approved by the national enforcement officials have been adopted so far as possible by the N F Sub Committee on Tablets, otherwise the preparation of these monographs would have proved to be an impossible task. This same statement could be made regarding the ampul monographs. If the years of work by the Joint Contact Committees regarding tolerances and assays had not been available and freely placed at the disposal of the N F Committee, these monographs would not have been possible.

*Research on Glandular Substances*—A special Sub Committee headed by Dr. Fantus and including Dr. H. W. Youngken of Boston and Dr. Marvin R. Thompson of Baltimore, and Dr. F. O. Taylor, Dr. David Klein, Dr. Frederic Fenger, Dr. James H. Hutton, all of Chicago, has been giving special consideration to tolerances and assay methods, histological descriptions and tests of identity and purity for a number of extensively used desiccated glandular substances.

*Research on Extractive Processes*—Dr. W. J. Husa and a number of collaborators have reported monthly during the year on their progress in the study of the scientific principles of extraction. Many interesting and important facts have been presented and the work appears to be progressing nicely and it may be possible, even yet to apply in a practical way the results of these extensive investigations to the monographs on extractive preparations in both the U S P and the N F.

## THE PRESCRIPTION INGREDIENT SURVEY

Especial mention should be made of the Prescription Ingredient Survey which was published in book form in June 1933. The work of originating this survey early in 1930, then pushing forward the accumulation of the data, and finally of preparing the data with extensive introductory chapters in form for publication has been a very heavy item in the chairman's office and has involved a large item of expense in connection with the N F revision.

There are more than 5000 primary names and about 1200 cross references in the tabulated portion of this publication. On the reports as received from the prescription readers, there were approximately 75,000 hand written names, often synonymne or abbreviated and hurriedly written, and these have been assembled into the 3553 names of ingredients in the U S P—N F Survey (Column G). The other names to make a total of about 5000 are found in the six other surveys that were incorporated into the completed report. Also there were approximately a quarter of a million tally marks on these report forms and these have been added and properly applied to each of the names.

Seventeen rolls of adding machine tape have been used in this work and it is estimated that more than 35,000 arithmetical calculations have been utilized in compiling these tabulations and in converting the numbers in all seven of these surveys to 10 000 prescription basis.

However, this Survey has been of very great value to the N F Committee, as well as to the U S P Committee, and its value will be reflected in N F VI when completed for a real scientific basis of admission has been established. This new basis is a foundation that will materially strengthen the National Formulary in medical circles and among pharmacists and other scientists.

A quantity of material illustrating the development of the Survey has been placed on exhibition during A Ph A week at Madison, and we trust that you will be sufficiently interested to give it the "once over."

On motion of Bradley, seconded by Philip and carried the report was received with appreciation to Chairman Gathercoal and his associates including those who worked on the U S P—N F Prescription Ingredient Survey.

**85 Committee on Research.** Chairman Army made a verbal report. Dr Husa's work under the grant of \$1000 made at the Toronto meeting had been splendid and a renewal of the grant for 1933 had already been voted to enable plans to be made for continuing the study of extraction. Dr Husa will present a short account of the work during a general session and a brief summary for publication in the JOURNAL. The final report will be condensed for later publication on account of cost. The report was accepted on motion of Caspari, seconded by Slocum and carried.

**86 Committee on Student Branches.** Chairman Philip reported verbally that on account of the present conditions, no special effort had been made to establish student branches although he hoped eventually to see one in each college. One branch at the California College of Pharmacy, was established during the year. The report was accepted on motion of Day seconded by Army and carried.

**87 Committee on Publications.** Chairman DuMez read the following report which was received on motion of Day seconded by Army and carried.

Your Committee on Publications respectfully submits the following report on its activities during the past year, and on the status of the ASSOCIATION'S publications.

**Journal.** The total expenditures for the publication of the JOURNAL for 1932, including the editor's salary, were \$19,995.51 (\$14,955.51 + \$5000.00). The total expenditures for 1931 were \$20,364.23 (\$15,364.23 + \$5000.00) which represents a decrease of \$368.72.

The receipts of the JOURNAL for advertising, subscriptions, sale of single copies, reprints, etc. for 1932 were \$8861.37. The subscription credit received for non-headquarters building members less 20% for overhead amounted to \$4718.97 making a total of \$13,580.34. The total receipts for 1931 were \$15,481.67. The receipts have, therefore, decreased by \$1901.33.

The total expenditures of \$19,995.51 less the receipts of \$13,580.34 show the net cost of the JOURNAL for the year to be \$6415.17. The net cost for 1931 was \$4882.56. The net cost of the JOURNAL has therefore increased by \$1532.61 over the preceding year. This increase in cost is due largely to a falling off in membership subscription credits, the falling off amounting to \$1293.69. The decrease in receipts from advertising amounted to \$605.66.

The JOURNAL was again printed and distributed by the Mack Printing Company of Easton, Pa.

Further details relative to the management and publication of the JOURNAL will be presented by Editor Eherle.

**Year Book.** Volume 19 of the YEAR BOOK covering the calendar year 1930 has been distributed. Three thousand copies were ordered and approximately 2500 of these have been distributed.

'You no doubt have observed that the size of the printed page has been increased materially in this volume. This has enabled us to reduce the number of pages by approximately 25 per cent and to effect a corresponding saving in cost of publication.

The abstracts for the years 1931 and 1932 will be combined and published in one volume which it is hoped will be ready for distribution before the end of the year. The page proof for the first half of the volume was about completed before I left Baltimore, and the material for the second half is in process of being assembled and classified.

'The contract for printing, binding and distribution of the book was again awarded to the Lord Baltimore Press of Baltimore, Maryland, because the estimates submitted by other firms did not offer sufficient advantages to justify a change.

As in the preceding several years, certain journals were again abstracted for the Committee of Revision of the United States Pharmacopœia, to cover the cost of which the Board of Trustees of the Pharmacopœial Convention contributed the sum of \$1000.00.

*Index of Proceedings and Year Books, 1903-1925* 1047 copies of the Index were printed and bound. Up to June 1, 1933, 377 copies had been sold or otherwise disposed of, leaving a stock on hand of 670 copies.

*National Formulary V* Up to June 1, 1933, a total of 47,626 copies were printed and bound in buckram and 500 copies were bound in leather. Of the copies bound in buckram, 46,526 had been sold and 80 copies had been distributed gratis. Of the copies bound in leather 136 copies had been sold and 12 copies had been distributed gratis. There were sold since June 1, 1932 1573 copies bound in buckram and 1 copy bound in leather leaving a stock on hand of 1020 copies bound in buckram and 352 copies bound in leather.

'Permission to use portions of the text of the National Formulary V for comment in a series of articles to be published in the *Journal of the American Dental Association* was granted to Samuel M. Gordon, secretary of the Council on Dental Therapeutics of the American Dental Association.

'The contract for printing and binding the National Formulary VI was awarded to the Mack Printing Company on July 24, 1933. Estimates on the cost of doing the job were called for and bids were actually received from four firms. That of the Mack Printing Company was the most favorable and the contract was, therefore, awarded to it.

*Pharmaceutical Recipe Book* Up to June 1, 1933, 5000 copies of the Recipe Book were printed and bound. Of this number 4487 copies had been sold and 93 complimentary copies had been distributed, leaving a stock on hand of 420 copies. The stock on hand at the same time last year was 698 copies which means that 278 copies were sold during the year.

'*Prescription Ingredient Survey* The Prescription Ingredient Survey prepared by Professor E. N. Gathercoal under the auspices of the AMERICAN PHARMACEUTICAL ASSOCIATION and the Board of Trustees of the United States Pharmacopœia was published in book form by the AMERICAN PHARMACEUTICAL ASSOCIATION. The publication was undertaken with the understanding that a sufficient number of subscriptions to defray the cost of publication would be obtained before the contract for printing was let. Because the book was desired for the meeting of the Revision Committee of the Pharmacopœia held on June 28 to 30, 1933, and the time was too short to secure all of the advanced subscriptions required, Professor Gathercoal went ahead with the printing of the book even though the stipulated conditions for publication had not been met.

"According to a report made by Professor Gathercoal as of July 27th, a total of 987 copies of the book were ordered printed and bound. Twenty one (21) copies were sent to Professor Cook for the Committee of Revision of the Pharmacopœia. 15 copies were billed to the AMERICAN PHARMACEUTICAL ASSOCIATION for the use of the Committee of Revision of the National Formulary, 129 copies were distributed on advance orders and 1 copy was distributed gratis leaving a stock on hand on July 27th of 821 copies.

'In conclusion your Committee desires to again express its appreciation to the members of the ASSOCIATION who have cooperated in promoting the interests of its publication and to extend thanks on behalf of the ASSOCIATION to the various pharmaceutical journals published in this country for their coöperation in giving publicity to the activities of the ASSOCIATION and its publications."

The secretary reported that the paper required for Series A numbering 25,000 copies, of the N. F. had been purchased and stored with the Mack Printing Company in advance of an

increase in price and that the Association would be expected to pay the interest and insurance charges

88 *Editor of the Year Book* Dr DuMez read the following report

Volume 19 of the YEAR BOOK covering the calendar year 1930 was completed July 17 1932 and distributed in January 1933 In this volume there are something over 200 pages less than in the preceding volume This reduction in the number of pages is largely the result of reducing the margins thereby increasing the size of the printed page A further reduction was effected by more careful discrimination in the selection of articles to be abstracted Naturally, this has reduced the cost of the volume to a considerable extent

"Volumes 20 and 21, covering the calendar years 1931 and 1932 will be published jointly The printing of the first half of this volume is now in the page proof stage and practically all of the work of assembling and classifying the material for the second half of the book has been completed If the printer will maintain the present pace, the completed volume will be ready for distribution by the end of the year We will then have the work as nearly up-to-date as can be expected from a practical standpoint

No doubt the Committee on YEAR BOOK will have some definite recommendations to make in its report this year The consensus of opinion seems to be that some means should be devised whereby the abstracts carried in the report on the progress of pharmacy may be made available to those interested in them sooner than is possible through the YEAR BOOK There are some, however, who believe that there is a real advantage in having the abstracts assembled in one book, and who prefer to receive them in that way If the system adopted by the Pharmaceutical Society of Great Britain is followed the groups representing both viewpoints can be satisfied Therefore if a change is to be made it is my opinion that we will do well to follow the British system, but that the abstracts should be carried in the JOURNAL now printed rather than in a separate publication set up for that purpose "

General satisfaction was expressed that the YEAR BOOK will probably be brought up to date during this year The report was received with thanks, on motion of Day, seconded by Army and carried

89 *Editor of the Journal* The following report was read by Editor Eberle

The report of the Editor herewith deals with the business of 1932 and as reports of previous years, is compared with the prior year 1931

The expenses of 1931 were \$15 364 23, not including the Editor's salary, the receipts were \$9469 01 Deduction of the receipts not including membership subscriptions, from expenses shows a net cost of \$5895 22, add the Editor's salary, and we have a net cost of \$10,895 22 The credit on membership subscriptions less 20% for overhead from the gross cost, which in 1931 is \$6012 66, deducted from the gross cost leaves \$4882 56 net cost including the Editor's salary An average of 5444 copies were printed monthly, making a cost per volume of about 89 cents

The expenses of 1932 were \$14 955 51, the receipts were \$8861 37 Following the plan of the foregoing, deduct the receipts, not including membership subscriptions from expenses shows a net cost of \$6094 14 Add the Editor's salary and we have a cost of \$11,094 14 The credit on membership subscriptions, not Headquarters members less 20% for overhead, which for 1932 is \$4718 97 from the gross cost, \$11 094 14 leaves \$6375 17 net cost, including the Editor's salary, an average of 4990 copies were printed monthly making a cost of about \$1 27 per volume The difference in net cost of the JOURNAL is \$1492 61 more for 1932 than 1931 which is nearly represented by the smaller credit for membership dues in 1932 than in 1931, receipts from advertising were \$605 66 less in 1932 than in 1931

Detailed comparative costs of 1931 and 1932 The number of copies of the JOURNAL printed in 1931, 65 330, in 1932, 59 900 Although the number of pages printed in 1931 and 1932 was about the same, 1366 in 1931 and 1362 in 1932 considerably more 8 point matter was printed in 1932 than in 1931, the purpose was to bring the larger amount of material embodied in the minutes in the issues of 1932, this to that extent increased the publication costs

"The number of pages as stated printed in 1931 was 1366 in 1932 1362 The publication costs in 1931 were \$11 031 35, in 1932, \$10,300 63 Mailing costs of the JOURNAL in 1931 were \$665 09, in 1932, \$655 21, mailing back numbers of the JOURNAL for 1931 cost \$25 70, for 1932 \$13 93 Engravings and photographs other than included in Mack Printing Company cost in 1931, \$480 50, in 1932, \$479 97 Binding JOURNALS in 1931 cost \$24 00, in 1932 \$43 50

stationery and office supplies in 1931, \$101 40, in 1932, \$86 73. Clerical including Professor Olsen's contributions to Department of Business Management cost in 1931, \$1356 50, in 1932 \$1419 00. Commissions on advertising in 1931 amounted to \$634 15, in 1932 \$554 08. Small miscellaneous items make up the remainder of the total expenses for 1931, of \$15 364 23 those of 1932 were \$14 955 51 less by \$408 72 in 1932 than in 1931.

Detailed comparative receipts of 1931 and 1932. The receipts for 1931 amounted to \$9469 01 those for 1932 \$8861 37. Advertising in 1931 brought \$6537 13, in 1932, \$5931 47. Subscriptions in 1931 amounted to \$1050 71, in 1932 \$939 91, it should be understood that we make every effort possible to bring subscriptions to memberships. Single copies, in 1931 brought \$303 31, in 1932, \$51 30. Reprints, in 1931, brought \$727 26 in 1932 \$1098 14. Miscellaneous items in 1931 amounted to \$815 60, in 1932, \$840 55. In 1931 the National Association of Boards of Pharmacy contributed \$257 50 in 1932 \$80 00. The American Association of Colleges of Pharmacy contributed \$300 00 in 1931 and the same amount in 1932. In 1931 J. U. Lloyd contributed \$50 00 toward the expense of printing his fourth paper on *Physics in Pharmacy* and we have now \$50 00 from him for the publication of the paper presented at Toronto. The Conference of Pharmaceutical Association Secretaries contributed \$25 00 in 1931 toward the expenses of printing their minutes in the *JOURNAL*. A like contribution was paid in March 1933 for 1932. The Conference of Law Enforcement Officials contributed \$50 00 in 1931 and for 1932 (credited in 1933 when it was paid) \$75 00. A number of reproductions of pictures and books have been made without cost to the *JOURNAL* and *ASSOCIATION*, and the sum derived from the sale of these was contributed to the *JOURNAL*—The Laboratory 'Dr Power in His Laboratory' 'Ground Breaking at Headquarters,' 'Proof Sheets of U S P I' 'New Nomenclature' which with contributions to the expenses of the *JOURNAL* amounted in 1932 to \$459 05. In recent years the papers presented to the Sections have increased in number and some in the pages of the reports, as a result we have about 25 papers unpublished several of these lengthy and a large list has been contributed for this meeting. A paper by Ewin Gillis and H. A. Langenhan—'A Phytochemical Study of *Hydrastis Canadensis*' is reported in about 130 type pages many tables and about 25 plates.

Among the papers in recent years have been these presented in partial fulfillment of work for degrees. It has occurred to the Editor that part of the expenses for papers of that type should be met by the authors. This suggestion was made to one of the authors but not favorably received. There are two sides to the question of course. Another expense that should, perhaps in part be met by authors is when a large number of cuts are used. Tabular matter should be summarized to an extent. While no name need be mentioned it is a pleasure to report that one of the contributors of two lengthy papers accepted the suggestion to have them printed as monographs with the statement that these papers were presented to the *AMERICAN PHARMACEUTICAL ASSOCIATION*. Without this cooperation it would not have been possible to print these papers. The *JOURNAL* has carried the expense of having reprints made of reports and minutes of meetings in connection with the annual convention for distribution at the sessions of the *ASSOCIATION* and for pharmaceutical publications. Also abstracts have been mimeographed for like distribution, one hundred or more were prepared for this meeting.

'Another work of interest and value has been undertaken in publishing. The Professional Pharmacy—an Analysis of Prescription Department Activities by Frank A. Delgado and Arthur Kimball. It is part of the National Drug Store Survey and published under and by authority of the U. S. Department of Commerce Bureau of Foreign and Domestic Commerce. Reprints will be made under paper cover and placed on sale at 25 cents per copy of 80 or more pages, 10% discount for quantities of 6 or more and 20% in quantities of 100 or more.

'Reference is made to page 671 of the *July JOURNAL* and a second installment is printed in the August issue of the *JOURNAL*. It is hoped to have Dr. S. L. Hilton contribute monthly information on prescription compounding and related subjects.

'Papers relating to U. S. P. and N. F. revision work have appeared in the *JOURNAL* and cooperation has been given to research work of the American Drug Manufacturers' Association and the American Pharmaceutical Manufacturers Association.

To name these papers specifically would extend the report and you doubtless are familiar with them.

In a recent issue for June the report of the Committee on Potent and Toxic Drugs of

the National Drug Trade Conference has been printed and quite widely distributed. Also Scope of Examination in Materia Medica and List of Drugs, recommended by the Committee on Materia Medica and approved by the Conference of State Boards and Colleges of N. A. B. P. District No. 2 as a list to which State Board Questions in Materia Medica should be restricted, see JOURNAL for June, pages 551-554 and 559-566.

Some attention has been given to the Costs of Medical Care. The Department of American Association of Colleges has had many valuable articles under the direction of Professor C. B. Jordan. Attention has been given to the Pharmacy Exhibit as part of the Century of Progress, International Exposition, also the Pan American Medical Congress, Prescription Tolerances and other phases of Prescription Practice.

Reproductions have been made of proof sheets of the first U. S. Pharmacopœia, Chemical Nomenclature and photographic enlargements of pictures of the Headquarters and others of historical interest. Some of these are here on exhibition. Also of the Leadbeater Pharmacy acquired for the ASSOCIATION and in which we had a part.

Finally may we say that while we miss the contribution toward meeting expenses of the National Association of Boards of Pharmacy we are grateful for their members' cooperation and of its officers and hope the time is near when that body will consider the possibility of again contributing. We are thankful for the support of the American Association of Colleges of Pharmacy.

Up to August first of last year the expenses of the JOURNAL amounted to \$8542.00, those of this year are \$7298.72. The receipts up to August first of last year were \$5150.94, for the same period of this year they are \$5022.18. Therefore the net cost of the JOURNAL is less by \$1114.52 than last year. Personally the Editor is thankful for the fine cooperation of many.

The necessity of reducing the length of papers for printing in the JOURNAL was considered but no action was taken. On motion of Arny seconded by Bradley and carried the report was received.

90 *Code for the Retail Drug Industry*. The president and secretary informed the members present of their activities in connection with the proposed Code and of the relation of the ASSOCIATION to it. The subject was discussed at length but no action was required at this time.

91 *Nomination of Honorary President, Secretary and Treasurer*. Dr. Edward Kremers was nominated to the House of Delegates as Honorary President, on motion of Philip seconded by Slocum. E. F. Kelly as Secretary, on motion of DuMez seconded by Bradley, and C. W. Holton as Treasurer, on motion of Arny seconded by Eberle.

92 *Annual Report of the Council to the House of Delegates*. Chairman Hilton and the secretary were authorized to prepare and present this report to the House, on motion of Eberle, seconded by DuMez and carried.

93 *Election of Members*. On motion of Bradley seconded by Eberle and carried, the following applicants were elected to membership:

No. 189 S. Walley Bower, 435 Tacoma Ave., Buffalo, N. Y.; No. 190, James A. Conway, 74 Chestnut St., Everett, Mass.; No. 191, C. Bertram Cox, 7 Burran Ave., Mosman, Sydney, Australia; No. 192, Frank R. Crotty, 28 Strathmore Road, Worcester, Mass.; No. 193, Morris Dauer, Clarkson and Albany Aves., Brooklyn, N. Y.; No. 194, C. B. Huddleston, Checotah, Okla.; No. 195, Olin E. Hill, 922 So. 4th St., Clinton, Iowa; No. 196, H. E. Kraft, 2819 West Juneau Ave., Milwaukee, Wis.; No. 197, John D. Laughlin, 602 First Central Bldg., Madison, Wis.; No. 198, J. M. Lea, 733 Main St., Danville, Va.; No. 199, Joseph Lo Pinto, U. S. Veterans Hospital, Canandaigua, N. Y.; No. 200, John F. McCloskey, 3400 Canal St., New Orleans, La.; No. 201, H. W. Mantz, 18th and Buttonwood Sts., Philadelphia, Pa.; No. 202, Samuel Mushlin, 284 East Spruce St., Manchester, N. H.; No. 203, Edwin A. O'Hara, 165 South St., Jamaica Plain, Mass.; No. 204, Barnet Shapiro, 240 Humboldt Ave., Roxbury, Mass.; No. 205, Sister Michael Maloney, 215 North Ave., Mt. Clemens, Mich.; No. 206, Fred W. Tate, 5548 Washington Ave., St. Louis, Mo.; No. 207, Linwood M. Welch, 1314 Riggs St., N. W. Washington, D. C.; No. 208, Louis C. Zopp, College of Pharmacy, Iowa City, Iowa.

94 *Election of Life Member*. Dr. J. Leon Lascoff annually offers as a prize in the College of Pharmacy, Columbia University, a Life Membership in the A. P. H. A. This year the prize has been awarded to Hymen Cohen, and Dr. Lascoff has forwarded his check for \$100.

On motion of Swain, seconded by Eberle and carried the following was elected to Life Membership:

No L M 1, Hymen Cohen, 915 Elsmere Place, New York, N Y

There being no further business the meeting adjourned

The third meeting of the Council was held on Thursday forenoon, August 31, 1933, Chairman Hilton presiding The other members present were Arny, Bradley, Day, Dunning, Philip, Slocum Eberle, DuMez and Kelly

The minutes of the Second Session were read and approved

95 *Special Committee on Year Book* Chairman George D Beal read the report of the Committee

'The Committee on YEAR BOOK begs leave to submit the following report

We have continued to study the problem assigned to us, namely, the future of the YEAR BOOK, and are more convinced than ever that the present Report on the Progress of Pharmacy, in spite of its scopefulness and careful preparation is not of sufficient service to the membership of the ASSOCIATION It is our opinion that the literature of pharmacy must be covered more promptly than at present and that this can only be done by the monthly publication of an abstract periodical We were gratified that the Council has accepted this view and expressed itself as favorable to the inauguration of Pharmaceutical Abstracts'

The Committee however, does not feel justified in recommending the immediate commencement of this program, realizing that the business situation the occupation of the National Institute of Pharmacy and other conditions probably make it impossible for the ASSOCIATION to give the financial support necessary for the launching of this publication We shall therefore content ourselves with presenting the partial conclusions we have reached during the past year leaving it to the Council to say whether or not our planning shall be continued

*I Scope of the Journal* We do not regard this publication as a potential competitor of other abstract periodicals such as *Chemical Abstracts* or *Biological Abstracts* We would point out though that an inevitable overlapping will occur if the JOURNAL is to have sufficient appeal to receive the necessary support from subscribers

The classification of the literature to be covered may be expressed briefly as follows

- 1 New remedies (proprietary and synthetic)
- 2 Medicinal chemicals
- 3 Pharmacognosy and pharmaceutical botany
- 4 Glandular products and vitamins
- 5 Serums and vaccines
- 6 Galenical preparations and manufacturing pharmacy
- 7 Analytical chemistry
- 8 Pharmacodynamics and toxicology
- 9 Therapeutics
- 10 Prescription practice
- 11 Pharmacopoeias formularies and bibliographies
- 12 Pharmaceutical economics and management
- 13 Pharmaceutical education and legislation
- 14 History and biography
- 15 Patents

## 'II Size of the Journal

Our YEAR BOOK for 1929 was made up as follows

Group	Abstracts	%	Pages.
Pharmacy	368	20 4	11 75
Materia Medica	137	7 6	38 75
New Remedies	253	14 1	26 50
Pharmacology	309	17 2	85 50
Chemistry Inorganic and Physical	49	2 7	11 75
Chemistry Organic	278	15 4	98 25
Chemistry Analytical	407	22 6	140 75
Total	1801	100 00	313 25



"There has been a feeling that the Report on the Progress of Pharmacy in the YEAR BOOK while of undoubtedly sufficient scope as to subjects, has not adequately covered the publication field. As an annual volume this degree of scope may be adequate, for current publication it does not seem so. The chairman has therefore made a count of the number of abstracts appearing in the *Squibb Abstract Bulletin* over a typical six weeks' period during the past year with the following result:

Subject	No Abstracts	Per Cent of Total
Pharmacy	13	2.5
Materna Medica	154	29.5
New Remedies	96	18.4
Pharmacology	104	19.9
Chemistry Inorganic and Physical	14	2.7
Chemistry Organic	96	18.4
Chemistry Analytical	45	8.6
Total	522	100.0
Estimated total for year	4500	

"The difference in percentage distribution in the above table is due largely to a different selection because of company interest.

'It will be difficult, without a careful study of all publications to be abstracted, to make a close estimate of the number of abstracts to be published.

"Realizing that the *Squibb Bulletin* abstracts a good deal that is not of direct pharmaceutical importance, and that the YEAR BOOK should be extended for the sake of completeness, we have arrived at an estimate of approximately 3000 abstracts per year with about 500 patents in addition. This estimate is concurred in by Miss Pickering of the Squibb Library.

"There is much criticism of *Chemical Abstracts* because of the brevity of the individual abstracts. It is too often necessary to consult the original article for even major details. With a lengthier, but still carefully condensed style of abstract in our JOURNAL, it is believed that our abstracts will run about five to the page, present JOURNAL size. This will call for about 600 pages per year, plus those required for a comprehensive author and subject index, which may approach another 100 pages. The average paging per month when the JOURNAL gets well under way will approximate 60 pages. This estimate, however, is not for the first year but for the JOURNAL in routine publication.

### "III Abstractors Required

'There should be at least as many abstractors as there are sections in the JOURNAL. For some of these more than one will be required while other abstractors will have to be selected because of their specific knowledge of languages. It is believed that the number of abstracting hours will approximate the number of abstracts, or a total of about 60 hours per week over the 52 weeks. If it is assumed that an editor will be provided for the journal, the assignment of articles, the indexing and a considerable amount of abstracting will be done by him. As to salaries of abstractors, it may be mentioned that the rate paid by *Chemical Abstracts* was \$3.25 per printed page, rather than per abstract, which for a 600 page journal would be under \$2000.00. Whether salaried abstractors will be required has not been agreed upon by the Committee.

"It is hoped however that a part of the abstracting can be done by forces engaged at present, and that abstracts from certain foreign countries can be obtained on a basis of exchange, which should considerably reduce our expenditures and perhaps eliminate all except that for the editorial office.

### "IV When Shall Publication Begin?

'The Committee believes that it should not make any recommendation leaving that to those appointed to determine the policies and administer the finances of the ASSOCIATION. It does wish to point out, however, that Pharmaceutical Abstracts need not begin as a separate journal, but that we may begin such publication at any time as a separate part of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, discontinuing the YEAR BOOK at that time. When the ASSOCIATION decides to separate the Commercial and Scientific parts of the JOURNAL

Pharmaceutical Abstracts' will go with the latter section, to be split off eventually if circumstances dictate or to be split off from the present JOURNAL if so required

'In the opinion of your Committee, there will be less expense involved in adding the abstracts to the present JOURNAL than in inaugurating an abstract journal. The monthly publication of abstracts may be carried on experimentally while all of the abstracting policies, such as scope and length are being established. The impressiveness and we are sure the popularity of the JOURNAL will be strengthened with an undoubted increase in the subscription list. The complaints regarding the staleness of the Report on the Progress of Pharmacy will be silenced. Finally, even 24 pages of abstracts in each issue of the JOURNAL will be more impressive than a separate 30-page abstract journal.

*Recommendation* We recommend that the Report on the Progress of Pharmacy be replaced as soon as financially possible by the monthly publication of Pharmaceutical Abstracts.

We further recommend that during the first year or more these be published in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, with separate paging and indexing, to be set up as a separate journal when a demand is established therefor.

We also call attention to the fact that much space may be made available in the present JOURNAL by publishing the full roster of committees, boards, etc., only quarterly or semi-annually, making available over 100 additional pages for publication of abstracts."

After general discussion the report was referred to the Committee on Publications for consideration and action upon motion of Day seconded by Dunning and carried.

96 *Pharmacy Exhibit at the Century of Progress* It was moved by Day that engrossed resolutions be prepared and forwarded to H. C. Christensen and that suitable letters be forwarded to F. B. Kirby and Julius Riemenschneider expressing the appreciation of the Council for their work as chairman, secretary and treasurer, respectively, of the committee which had charge of the exhibit.

97 *Vacation for the Secretary* In the absence of the secretary from the meeting, it was moved by Dunning, seconded by all present and carried, that the secretary be hereby directed to begin within fifteen days a vacation of three weeks with a complete discontinuation of all A. P. H. A. work.

98 *Salary of the Secretary and the Editor of the Journal* On motion of Bradley, seconded by all members present, Secretary Kelly was directed to draw his full salary and that the Editor be requested not to contribute any portion of his salary to the ASSOCIATION'S expenses.

99 *American Council on Pharmaceutical Education* D. F. Jones read the following report, signed by himself, E. F. Kelly and H. A. B. Dunning the A. P. H. A. representatives on the Council.

The final steps in the creation of the Council on Pharmaceutical Education were taken at the Toronto meeting held just about one year ago. Immediately thereafter the Council representatives who were present met and formed a tentative organization on the assumption that such action would enable the Council to begin functioning almost immediately. Unfortunately the membership of the Council was not completed until January of this year, which held back the work for several months in spite of the foregoing precautions taken to prevent delay.

Immediately after the membership of the Council was completed, a permanent organization was set up. E. F. Kelly serving as chairman and A. G. DuMez as secretary.

At the meeting held in Toronto it was agreed that the setting up of standards for schools of Pharmacy should be the first work undertaken by the Council, and that the standards suggested by Dean Leigh in his presidential address last year be used as the basis for beginning the work. The actual beginning of the work was however deferred at the suggestion of the representative of the American Council on Education who was of the opinion that an effort should first be made to secure the support of the schools which do not hold membership in the American Association of Colleges of Pharmacy and are, therefore, not represented in the present make up of the Council. The representative of the American Council on Education volunteered to attempt to secure the cooperation of these schools and the matter was therefore left in his hands. The progress which he has made in this direction cannot be reported at this time as he was compelled to go to Europe and is not expected to return until the middle of September. During the meantime, however, the secretary of the Council has been assembling data and perfecting plans for going ahead with the work.

'At the Second Meeting of the Council which was held on Sunday evening, August 27, 1933, it was decided to go forward immediately with the program as originally planned, using Dean Leigh's suggested standards as a basis upon which to begin work.

To defray the expenses of getting started and carrying out the work contemplated for the coming year, the attached budget was approved. As this expense is to be shared equally by each of the three associations represented, it is recommended that an appropriation of \$300.00 our proportionate share, be made for this purpose by the ASSOCIATION."

Filing cabinets	\$ 50 00
Stationery and office supplies	75 00
Stenography	150 00
Printing and mimeographing	150 00
Assistance in securing and tabulating data	150 00
Postage and express charges	75 00
Telephone calls and telegrams	50 00
Travelling expenses	100 00
Miscellaneous items	100 00
Total	\$900 00

100 *Committee on Unofficial Standards* The report of the Committee was read by Chairman Krantz

'*Organization* Since the presentation of the 1932 report, the personnel of the Committee on Unofficial Standards of this ASSOCIATION has remained practically unchanged. The Committee is divided into two sections, a chemical section under the chairmanship of Dr. Hugo H. Schaefer, and a botanical section under the chairmanship of Professor E. B. Fischer. In addition to the regular members of the Committee there are serving in the capacity of consultants several associate members.

'*Progress of Work* Last year Doctor Rose submitted a tentative monograph for a preparation containing the glucosides of digitalis suitable for injection. During this year the committee has extensively studied this preparation in collaboration with Dr. James C. Munch, and we feel that a more or less stable and dependable digitalis preparation has been devised. At the Pocono meeting of the Revision Committee of the United States Pharmacopoeia, Doctor Scoville spoke of the desirability of including a preparation of this type in the forthcoming revision of the Pharmacopoeia. The Committee on Unofficial Standards submitted its work to Doctor Scoville to be studied further for the purpose of including the monograph in the Pharmacopoeia.

'*Plans for Future Work* The Committee in planning its future work invites the suggestions from ASSOCIATION members interested in the establishment of standards. It is their purpose during the coming year to project our preparation of monographs and standards to some of the new and more generally used unofficial drugs.'

It was received on motion of DuMez, seconded by Arny and carried.

After a general discussion of the work of the Committee and upon the suggestion of Chairman Krantz, the committee was discontinued on motion of Bradley, seconded by Philip and carried, since there seems to be no present need for the committee.

101 *Expenses of the President and the Contacting of Graduates of the Schools and Colleges of Pharmacy* President Philip submitted suggestions dealing with these subjects which, after discussion, were referred to the Committee on Finance for study when the finances of the ASSOCIATION justify. On motion of Bradley, seconded by Arny and carried.

102 *Reprints of the President's Address* It was moved by Dunning, seconded by Arny and carried that fifty reprints of his address be sent complimentary to the retiring president.

The meeting then adjourned.

The Fourth Meeting of the Council of 1932-1933 was held on Friday evening, September 1, 1933. Chairman Hilton presided and the other members present were Arny, Bradley, Day, Eherle, DuMez, Slocum and Kelly.

The minutes of the Third Meeting were read and approved.

The chairman announced that the work of the Council was completed and declared the Council adjourned

E F KELLY, *Secretary*

# THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION 1933-1934

Office of the Secretary, 10 West Chase Street, Baltimore Md

## LETTER NO 1

September 1, 1933

### To the Members of the Council

The reorganization and First Meeting of the Council 1933-1934 was held in the Hotel Loraine, Madison, Wisconsin, on Friday, September 1, 1933 beginning at 10 25 P M

1 The roll was called and the following were present Army, Adams, Swain, Krantz, Fischels, Hilton Kelly, Eberle, DuMez and Costello

2 *Election of Chairman* S L Hilton was elected Chairman of the Council for 1933-1934 on motion of Swain, seconded by Army and carried

3 *Election of Vice Chairman* C H LaWall was elected Vice Chairman of the Council for 1933-1934 on motion of Army, seconded by Adams and carried

4 *Election of Editor of the Journal* E G Eberle was elected Editor of the JOURNAL for 1933-1934 on motion of Adams, seconded by Fischels and carried

5 *Election of Editor of the Year Book* A G DuMez was elected Editor of the YEAR BOOK for 1933-1934 on motion of Eberle, seconded by Army and carried

6 *Membership of the Council* The membership and officers of the Council for 1933-1934 are as follows

### ELECTED MEMBERS

H A B Dunning, Charles and Chase Sts Baltimore, Md (Term expires 1934)  
S L Hilton 1033 Twenty Second St N W, Washington, D C (Term expires 1934)  
Ambrose Hunsberger 1600 Spruce St, Philadelphia, Pa (Term expires 1934)  
J H Beal, Fort Walton Fla (Term expires 1935)  
C E Caspari, Euclid and Parkview Aves, St Louis, Mo (Term expires 1935)  
C H LaWall, 214 S 12th St Philadelphia, Pa (Term expires 1935)  
H V Army 115 W 68th St, New York, N Y (Term expires 1936)  
H C Christensen 130 N Wells St Chicago, Ill (Term expires 1936)  
W D Adams, Forney Texas (Term expires 1936)

### EX OFFICIO MEMBERS

R L Swain 2411 N Charles St, Baltimore, Md  
R P Fischels, 28 W State Street, Trenton, N J  
John C Krantz Jr, 2411 N Charles St, Baltimore, Md  
E F Kelly 10 West Chase St Baltimore Md  
C W Holton Box 81, Essex Falls N J  
P H Costello, Cooperstown N Dak  
E G Eberle 10 W Chase St, Baltimore, Md  
A G DuMez Lombard and Greene Sts Baltimore Md

### OFFICERS OF THE COUNCIL

S L Hilton, *Chairman*  
C H LaWall, *Vice Chairman*  
E F Kelly *Secretary*

7 *Finance Committee* Chairman Hilton appointed R L Swain Chairman C H LaWall and C W Holton as members of the Committee on Finance, and these appointments were confirmed on motion of Adams, seconded by DuMez and carried

8 *Committee on Property and Funds* The personnel of this Committee as provided for in the Council By-Laws is as follows for 1933-1934 R L Swain C W Holton, S L Hilton H C Christensen and E F Kelly

9 *Committee on Publications* Chairman Hilton appointed H V Army, C H LaWall and Walter D Adams as members of the Committee, the other members being E G Eberle, E F Kelly, A G DuMez and C W Holton, as provided in the By Laws. These appointments were confirmed on motion of Adams, seconded by Costello. Chairman Hilton appointed A G DuMez as Chairman of the Committee on Publications.

10 *Committee on Standard Program* The chairman appointed S L Hilton, T J Bradley and E F Kelly as members of the Committee on Standard Program.

11 *Committee on Year Book* The chairman appointed the following members: Geo D Beal, Chairman, F W Nitardy, H W Youngken, E N Gathercoal, E E Swanson, J C Munch and J C Krantz, Jr.

12 *Executive Committee of the Council* It was moved by Army that the chairman be authorized in case the occasion should arise to appoint an Executive Committee consisting of seven members. The motion was seconded by Adams and carried.

13 *Committee on Pharmaceutical Research* On motion of Fischelis, seconded by Adams and carried, H V Army and C H LaWall were elected members of this Committee to serve until 1938.

14 *Commission on Proprietary Medicines* C E Caspari was elected a member of this Commission to serve until 1938 on motion of DuMez, seconded by Krantz and carried.

15 *Committee on Recipe Book* After a general discussion it was moved by Army that the Committee on Recipe Book be continued for one year. The motion was seconded by Adams and carried.

It was moved by Army that a special committee be appointed to study the matter of putting the Committee on Recipe Book on a ten year basis and also its personnel. The motion was seconded by Fischelis and carried.

16 *Appointment of Standing and Special Committees and Delegates of the Association* The president was authorized on motion of Adams, seconded by Army and carried, to make such appointments as are now authorized to fill vacancies as they may occur and to make additional appointments as may be necessary or advisable during the year.

The meeting then adjourned.

E F KELLY, Secretary

To Dr and Mrs Edward Kremers in appreciation of hospitality to their guests at the lawn party given at their home to visiting friends of the AMERICAN PHARMACEUTICAL ASSOCIATION

Last evening as we stood upon your lawn  
And looked around the lovely country side  
How beautiful it was at eventide!  
How splendid must it be at early dawn!

You chose a charming spot your home to rear  
So neatly placed upon the gentle slope,  
That on each side you get the fullest scope  
Of landscape spreading far and wide and clear

We saw it first in all its wide extent  
With full horizon circled to our view  
We saw Mendota lying clear and blue  
Serenely calm and placidly content

Then as the sun sank slowly out of sight  
And shadows fell upon the lovely scene,  
A peaceful silence, simple and serene  
Descended with the duskness of night

Then o'er the scene there came a gradual  
change

The moon near full rose steadily on high

And stars began to twinkle in the sky,  
Effecting a new picture quaintly strange  
We stood awhile close wrapped in night's embrace

Then went within your neat and cozy home  
Our feelings there were those which surely come  
To all who enter first your peaceful place

Its atmosphere reflects your own fine calm  
Your dignity most courteous and benign  
We understand it was your own design—  
Like ancient Horace with his Sabine Farm

How fortunate you are in your retreat  
From all the bickerings and all the strife  
From all the noise and din of city life,  
Your joys of home must surely be complete

The evening meal kept all of us employed  
For every one partook with keen delight  
Such food indeed, went well with such a night  
The whole of which we thoroughly enjoyed

We wish that you should know just how we feel  
About you, and about your lovely home  
May happiness for many years to come  
Be yours—with friendships, many true and real

WAYLAND D. WILCOX

## REPORT OF THE FAIRCHILD SCHOLARSHIP EXAMINATION

A special committee on Fairchild Scholarship reported at the Toronto meeting and suggested a plan of examination. This committee was composed of Prof. C. C. Glover, Chairman, University of Michigan, Dr. Glenn L. Jenkins, University of Maryland, Dr. F. A. Gillilan, State College, Corvallis, Oregon. It so happened that the University of Michigan had no candidate to present this year and Professors C. C. Glover, C. H. Stocking, F. F. Blicke and J. L. Power kindly consented to prepare the examination questions and grade the papers. It was, therefore, an opportunity for Chairman Glover to make use of the report of the Special Committee.

Twenty-seven candidates participated in the examination, it will be noted that several tied in averages, hence 22 averages are listed. The pharmacy school records extended over different periods and the results may be of interest. Fourteen had concluded a course in Pharmacy, extending over three years, their averages were, respectively, 44, 50, 51, 52, 53, 56, 58, 60, 62, 63, 64, 65, 74, 75. Ten of the candidates had completed a four-year course and their averages are 81, 79, 73, 72, 69, 67, 63, 59, 58, 41. One candidate has carried on work for five years and made an average of 58. Two candidates with six-year records, were graded 74 and 59, respectively. Eighteen schools were represented in the examinations. The subjects were given under the following divisions: Chemistry, Materia Medica and Pharmacy. The results are given in the following tabulation:

	Chemistry	Materia Medica	Pharmacy	Average
1	65	94	84	81
2	76	86	76	79
3	71	84	72	75
4	70	75	79	74
4	63	86	74	74
5	61	87	71	73
6	73	84	60	72
7	66	74	67	69
8	43	86	73	67
9	50	84	63	65
10	50	82	60	64
11	49	80	61	63
11	43	81	66	63
12	59	78	51	62
13	52	76	54	60
14	36	86	57	59
14	30	78	70	59
15	36	77	63	58
15	60	63	53	58
15	30	84	61	58
16	53	77	39	56
17	25	77	59	53
18	37	66	53	52
19	25	77	54	51
20	30	51	69	50
21	17	68	48	44
22	25	63	37	41

There were twenty-seven candidates, several of whom tied in their general averages. The general averages for the twenty-seven candidates are: Chemistry, 48; Materia Medica, 78; Pharmacy, 62.

The first candidate in general average, 81, is a student of a four-year course. He was fifth in Chemistry, first in Materia Medica and first in Pharmacy. The second candidate, 79, was first in Chemistry, third in Materia Medica, third in Pharmacy. The third candidate, 75, ranks third in Chemistry, tied with three others in Materia Medica for sixth place, was sixth in Pharmacy. Two, on average, tied for fourth place, one stood fourth in Chemistry, twentieth in Materia

Medica, second in Pharmacy, the other was sixth in Chemistry, tied with four for third place in Materia Medica, fourth place in Pharmacy. There are a number of unusual standings but these will happen. Perhaps gradings of candidates from the same school may be of interest. Average 69 and 79, Chemistry, 66 and 76, Materia Medica, 74 and 86, Pharmacy, 67 and 76. Average, 75 and 74, Chemistry, 71 and 63, Materia Medica, 84 and 86, Pharmacy, 72 and 74. Average, 41 and 59, Chemistry, 25 and 36, Materia Medica, 63 and 86, Pharmacy, 37 and 57. Average, 58 and 72, Chemistry, 36, 73, Materia Medica, 77 and 84. Pharmacy, 63 and 60. Average, 62 and 58, Chemistry, 59 and 60, Materia Medica, 78 and 63, Pharmacy, 51 and 53. Average, 63 and 56. Chemistry, 49 and 53, Materia Medica, 80 and 77, Pharmacy, 61 and 39. Average, 64 and 60, Chemistry, 50 and 52, Materia Medica, 82 and 76, Pharmacy, 60 and 54. Average, 58 and 51. Chemistry, 30 and 25, Materia Medica, 84 and 77, Pharmacy, 61 and 54. Average, 50 and 53, Chemistry, 30 and 25, Materia Medica, 51 and 77, Pharmacy, 69 and 59.

The chairman desires to thank his colleagues for their support and the members of the Examining Committee for their helpfulness. He hopes that he has not taxed their patience.

The winning candidate is Miles Edward Drake, of the Oregon Agricultural College, School of Pharmacy, Corvallis. He graduated from High School and entered as a freshman in the School of Pharmacy, September 27, 1929, and graduated June 5, 1933, with the degree of B S.

W. BRUCE PHILIP

C. H. STOCKING

CLARE ALLAN

E. G. EBERLE, *Chairman*

### MILES EDWARD DRAKE

(Winner of the Fairchild Scholarship for 1933)

Miles Edward Drake was born in Salt Lake City, Utah. He received his earlier education



MILES EDWARD DRAKE

in Oregon and was graduated from Franklin High School, Portland, June 17, 1927, receiving his highest grades in science subjects. During his high school and later college career he took an active part in athletics, winning his letter in soccer. After leaving high school he had one year of surveying experiences and one year of office work with the United States Bureau of Public Roads.

In 1927 he entered the Oregon State College School of Pharmacy and received his B S degree in Pharmacy, June 5, 1933. In addition to completing the pharmacy curriculum, he took special work in bacteriology.

He is a former president of the Oregon State College Pharmaceutical Association and of Rho Chi Chapter, member of Phi Kappa Phi, all-institution honor student of the College and a member of Alpha Tau Omega social fraternity, and was awarded the Lehn & Fink medal in 1933. He passed the Oregon State Board of Pharmacy examinations with a high average. His home address is 6123—83rd Ave S E, Portland, Oregon.

*The Drug and Cosmetic Industry* has issued the second edition of the "Drug and Cosmetic Catalog" edited by Francis Chulson. The volume contains about 350 pages and its table of contents includes Machinery and Packaging, Raw Materials, Statistics and Association.

# ABSTRACTS OF PAPERS PRESENTED BEFORE SCIENTIFIC SECTION AMERICAN PHARMACEUTICAL ASSOCIATION, MADISON MEETING, 1933

"Assay for Benzoate and Salicylate" by Jacob Schmidt and John C. Krantz, Jr.—A rapid volumetric method has been devised for the determination of sodium salicylate and benzoate which consists of titrating the alkali in combination with the organic acid in the presence of ether in methyl orange.

Detection of Small Quantities of Carbon Monoxide in Medicinal Oxygen" by Jacob E. Schmidt and John C. Krantz, Jr.—A method has been devised to determine small quantities of carbon monoxide in medicinal oxygen by a modification of the iodine pentoxide method.

"The Water Content of Magnesium Oxide," by Jacob E. Schmidt and John C. Krantz, Jr.—A study has been made of various commercial samples of light and heavy magnesium oxide in respect to the amount of water that might be found present. The water content of the oxide was compared under several conditions.

"The Barbituric Acid Derivatives as Drugs," by J. H. Graham—This paper, which is a brief but comprehensive review of the literature during the last thirty years, on the derivatives of barbituric acid used as drugs, calls attention to the numerous new preparations, many of which are being actively experimented with in research laboratories; enumerates their important physiological properties, emphasizes their toxic properties, and, finally, urges that pharmaceutical and medical societies endeavor to bring about proper legislation toward prevention of promiscuous sale of these drugs, and the prevention of the use of the same by the laity except on physician's prescription.

"The Gravimetric and Volumetric Determination of Antipyrine as Hydroferrocyanide in the Presence of Amidopyrine," by I. M. Kolthoff—In acid medium antipyrine gives a crystalline precipitate with ferrocyanide having the composition  $(C_{11}H_7NO)_2H_2Fe(CN)_6$ . By means of this precipitation reaction 2.5 mg. antipyrine can be detected in 5 cc. of solution. A gravimetric and volumetric procedure has been described for the quantitative estimation of antipyrine in the form of its hydroferrocyanide. The method can be applied in the presence of pyrazolone.

"Tincture of Digitalis," by L. W. Rowe and W. L. Scoville—A continuation of the work reported two years ago. Three series of five samples each and varying in many particulars were subjected to stability tests and it was found that only the samples which contained anhydrous sodium acetate were fairly stable in activity. A formula for the preparation of Tincture Digitalis is offered as a definite subject for consideration.

Also a continuation of work reported two years ago. Four series of three samples each varying in some important particular were subjected to stability tests and it was found that the use of a small amount of hypophosphorous acid seemed to retard deterioration.

## PHARMACY WEEK NATIONAL WINDOW CONTEST

ANTON HOGSTAD, JR., NATIONAL CHAIRMAN PHARMACY WEEK EXECUTIVE COMMITTEE 161 SIXTH AVE. NEW YORK, N. Y.

The Federal Wholesale Druggists' Association has donated a beautiful silver cup to be awarded by the National Executive Committee on Pharmacy Week for the best professional window display exhibited in any retail pharmacy in the United States during Pharmacy Week, October 9 to 14, 1933.

### RULES OF CONTEST

1. A professional window display it has been determined is a display picturing any subject pertaining to professional pharmacy, pharmaceutical education, legislation, literature, etc.

2. The best professional window display will be selected from photos taken of windows dressed in accordance with Rule 1 of the Contest, and submitted as follows:

(a) The secretary of each state pharmaceutical association will send in to National Pharmacy Week headquarters, 161 Sixth Ave., New York, N. Y., the photo of the best professional window display of his state. He may determine the best display by a state contest or by some other method which he or his association may select.



(b) No photos may be sent direct by contestants to National Pharmacy Week headquarters—they must be sent to the secretaries of the state associations to which the contestants belong for competition in the state contests. The secretary of each state association will then mail the winning photograph in his state to National Pharmacy Week headquarters for competition in the National Contest.

(c) The District of Columbia will be considered as a state association and the secretary of its pharmaceutical association will submit the winning photograph to National Pharmacy Week headquarters to be entered in the National Pharmacy Week Window Contest.

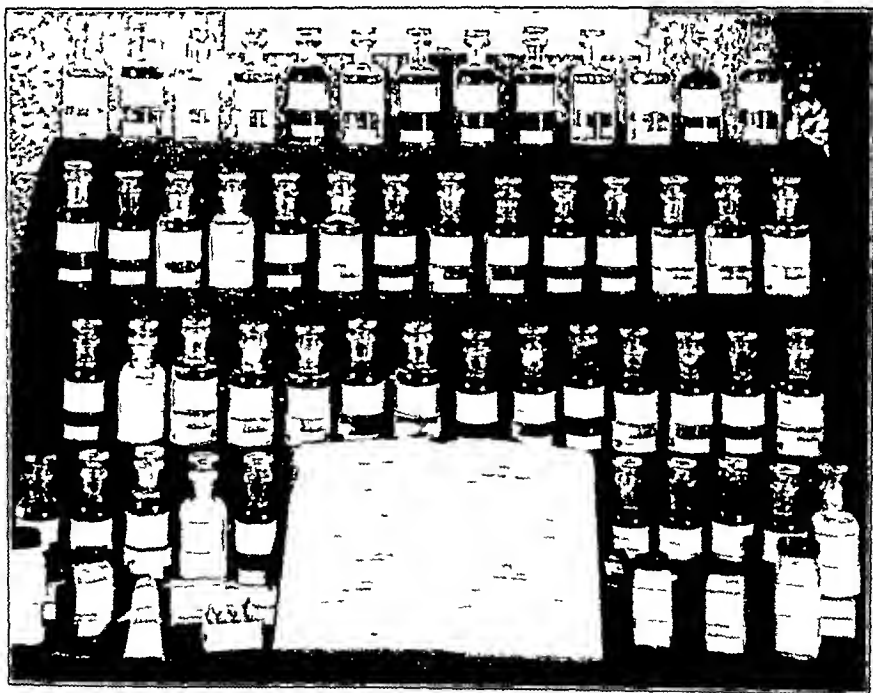
3 Photos submitted must show the entire window. The photos must be large enough so that details of display will be plainly shown and although no definite restrictions are made, it can hardly be expected that this could be accomplished in a photo smaller than 5" x 7", 8" x 10" being the ideal size.

4 Competing windows must be non commercial although manufactured pharmaceutical, chemical and biological products which are related to the practice of professional pharmacy may be displayed. Merchandise unrelated to professional pharmacy must not be displayed. Price tags must not be used.

5 No photos will be accepted as eligible for the National Pharmacy Week Window Contest if postmarked later than midnight of Dec 1, 1933.

6 The winner of the 1933 contest will be decided by a committee of five judges, consisting of prominent pharmaceutical figures from the city of Chicago.

7 Announcement of award of the championship trophy will be made through the pharmaceutical journals of the nation and the silver cup will be formally presented to the winner.



An Exhibit of Preparations of the Pharmaceutical Recipe Book, A. P. H. A., by Chairman J. Leon Lascoff displayed at the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, it shows the possibilities for Pharmacists.

# ABSTRACTS OF PAPERS PRESENTED BEFORE SCIENTIFIC SECTION, AMERICAN PHARMACEUTICAL ASSOCIATION, MADISON MEETING, 1933

"Assay for Benzoate and Salicylate" by Jacob Schmidt and John C. Krantz, Jr.—A rapid volumetric method has been devised for the determination of sodium salicylate and benzoate, which consists of titrating the alkali in combination with the organic acid in the presence of ether in methyl orange.

"Detection of Small Quantities of Carbon Monoxide in Medicinal Oxygen," by Jacob E. Schmidt and John C. Krantz, Jr.—A method has been devised to determine small quantities of carbon monoxide in medicinal oxygen by a modification of the iodine pentoxide method.

"The Water Content of Magnesium Oxide," by Jacob E. Schmidt and John C. Krantz, Jr.—A study has been made of various commercial samples of light and heavy magnesium oxide in respect to the amount of water that might be found present. The water content of the oxide was compared under several conditions.

"The Barbituric Acid Derivatives as Drugs," by J. H. Graham—This paper, which is a brief but comprehensive review of the literature during the last thirty years, on the derivatives of barbituric acid used as drugs, calls attention to the numerous new preparations, many of which are being actively experimented with in research laboratories, enumerates their important physiological properties, emphasizes their toxic properties, and, finally, urges that pharmaceutical and medical societies endeavor to bring about proper legislation toward prevention of promiscuous sale of these drugs, and the prevention of the use of the same by the laity except on physician's prescription.

"The Gravimetric and Volumetric Determination of Antipyrine as Hydroferrocyanide in the Presence of Amidopyrin," by I. M. Kolthoff—In acid medium antipyrine gives a crystalline precipitate with ferrocyanide having the composition  $(C_{11}H_9NO)_2Fe(CN)_6$ . By means of this precipitation reaction 2.5 mg. antipyrine can be detected in 5 cc. of solution. A gravimetric and volumetric procedure has been described for the quantitative estimation of antipyrine in the form of its hydroferrocyanide. The method can be applied in the presence of pyrimidin.

"Tincture of Digitalis" by L. W. Rowe and W. L. Scoville—A continuation of the work reported two years ago. Three series of five samples each, and varying in many particulars, were subjected to stability tests and it was found that only the samples which contained anhydrous sodium acetate were fairly stable in activity. A formula for the preparation of Tincture Digitalis is offered as a definite subject for consideration.

Also a continuation of work reported two years ago. Four series of three samples each, varying in some important particular, were subjected to stability tests and it was found that the use of a small amount of hypophosphorous acid seemed to retard deterioration.

## PHARMACY WEEK NATIONAL WINDOW CONTEST

ANTON HOGSTAD, JR., NATIONAL CHAIRMAN, PHARMACY WEEK EXECUTIVE COMMITTEE, 161 SIXTH AVE., NEW YORK, N. Y.

The Federal Wholesale Druggists Association has donated a beautiful silver cup to be awarded by the National Executive Committee on Pharmacy Week for the best professional window display exhibited in any retail pharmacy in the United States during Pharmacy Week, October 9 to 14, 1933.

### RULES OF CONTEST

1. A professional window display, it has been determined, is a display picturing any subject pertaining to professional pharmacy, pharmaceutical education, legislation, literature, etc.

2. The best professional window display will be selected from photos taken of windows dressed in accordance with Rule 1 of the Contest, and submitted as follows:

(a) The secretary of each state pharmaceutical association will send in to National Pharmacy Week headquarters, 161 Sixth Ave., New York, N. Y., the photo of the best professional window display of his state. He may determine the best display by a state contest or by some other method which he or his association may select.

(b) No photos may be sent direct by contestants to National Pharmacy Week headquarters—they must be sent to the secretaries of the state associations to which the contestants belong, for competition in the state contests. The secretary of each state association will then mail the winning photograph in his state to National Pharmacy Week headquarters for competition in the National Contest.

(c) The District of Columbia will be considered as a state association and the secretary of its pharmaceutical association will submit the winning photograph to National Pharmacy Week headquarters to be entered in the National Pharmacy Week Window Contest.

3 Photos submitted must show the entire window. The photos must be large enough so that details of display will be plainly shown and although no definite restrictions are made, it can hardly be expected that this could be accomplished in a photo smaller than 5' x 7", 8' x 10" being the ideal size.

4 Competing windows must be non commercial although manufactured pharmaceutical, chemical and biological products which are related to the practice of professional pharmacy may be displayed. Merchandise unrelated to professional pharmacy must not be displayed. Price tags must not be used.

5 No photos will be accepted as eligible for the National Pharmacy Week Window Contest if postmarked later than midnight of Dec 1 1933.

6 The winner of the 1933 contest will be decided by a committee of five judges, consisting of prominent pharmaceutical figures from the city of Chicago.

7 Announcement of award of the championship trophy will be made through the pharmaceutical journals of the nation and the silver cup will be formally presented to the winner.



An Exhibit of Preparations of the Pharmaceutical Recipe Book, A. P. H. A., by Chairman J. Leon Lascoff, displayed at the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, it shows the possibilities for Pharmacists.

## EDITORIAL NOTES

### THE PHARMACOPEIA WILL ESTABLISH AN OFFICIAL METHOD FOR PREPARING PERCENTAGE SOLUTIONS

The following is taken from the report of Chairman E F Cook, presented at the annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, held in Madison

The correct method for preparing a percentage solution for medicinal use has long been in dispute. Some authorities have always insisted upon using the 'weight-weight' (w/w) method as the only correct procedure. Others have argued with equal insistence that the 'weight-volume (w/v)' method was the only practical plan. The new British Pharmacopœia has led the way to make the practice in drug stores uniform by prescribing an official method as follows

#### PERCENTAGE SOLUTIONS

'In defining standards, the expression per cent is used according to circumstances with one of three different meanings. In order that the meaning to be attached to the expression in each instance may be clear the following notation which has long been in use by pharmacists has been adopted

*Per cent w/w, percentage, weight in weight,* expresses the number of Gm of active substance in 100 Gm of product

*Per cent w/v, percentage, weight in volume,* expresses the number of Gm of active substance in 100 millilitres of product

*Per cent v/v, percentage, volume in volume,* expresses the number of millilitres of active substance in 100 millilitres of product

The strengths of solutions of solids in liquids are expressed as percentage weight in volume of liquids in liquids as percentage volume in volume, and of gases in liquids as percentage weight in weight

In the dispensing of prescriptions, when the expression per cent is used without qualification, it is to be interpreted to mean, for solutions of solids in liquids, per cent weight in volume for solutions of liquids in liquids, per cent volume in volume, for solutions of gases in liquids per cent weight in weight. Thus a 10 per cent' or a 1 in 10 solution is prepared by dissolving 10 Gm of a solid, or 10 millilitres of a liquid, in sufficient of the solvent to make 100 millilitres. A solution of the same strength may be prepared on the

Imperial System, and on the Apothecaries' System, by dissolving 44 grains (more precisely 43.847 grains) of a solid, or 48 minims of a liquid, in sufficient of the solvent to make 1 fluidounce (480 minims) of solution."

Our own Committee of Revision, after discussion, voted at the recent Conference to introduce a similar paragraph in the new Pharmacopœia

### THE REVISION OF THE FOOD AND DRUGS ACT IN ITS RELATION TO THE U S P

No one can now predict the final form in which the rewritten Federal Food and Drugs Act may be passed by Congress or when that may occur, but it is of the utmost importance to the work of our Committee and to the future of the United States Pharmacopœia that it should retain essentially the status proposed in the first draft offered to Congress by the Secretary of Agriculture and introduced into both the Senate and the House

The added recognition of Pharmacopœial standards covering as it does the U S P and N F definitions, descriptions, formulas, tests, assays and the packaging and labeling specifications places greatly increased responsibility upon the decisions of the U S P Revision Committee

The 'variation clause' is retained to meet the legitimate need for modifications in official products, such as the demand for a 'Half Strength or Double-Strength Ointment of Mercuric Oxide' 'Half Strength Tincture of Iodine,' etc. and to allow the sale of products of technical grade and also to permit the sale of established preparations differing in flavor, color or strength from the official. However, the new requirement will compel a labeling which clearly indicates wherein the unofficial product differs in strength, quality and purity from the specifications of the Pharmacopœia or National Formulary. This has not been a part of the law heretofore

The feature which authorizes the secretary to prescribe additional tests or assay methods to determine whether or not the official standards are being complied with should it be found necessary, is entirely new

This, however, greatly strengthens the position of the Pharmacopœia, for no vital objective or responsibility of our Committee

is disturbed and the enforcement of the necessary standards which our Committee have established is helped. The first duty of the Committee of Revision is to decide the scope of the new Pharmacopœia, that it may represent the therapeutic agents of the day believed to be worthy of recognition. This duty remains exclusively in our hands.

#### ACCURACY OF VITAMIN A TEST IN RELATION TO DURATION OF TEST

By a statistical examination of the results of 201 vitamin A tests, the accuracy of such tests for a period of dosing of one to five weeks was determined. The experiments were carried out by the usual method of feeding rats on a diet deficient in vitamin A until they ceased to grow and then giving in addition doses of the substance under examination for a period of five weeks. The results were calculated from the responses of the rats alive at the end of each week of the test, 1129 buck and 1282 doe were alive at the end of the first week and 960 buck and 1110 doe at the end of the fifth week. The curves relating increase in weight to dose of vitamin A given were found to be approximately logarithmic for each week as would be expected from those previously published for five weeks growth.

The standard deviation of the increase in weight of these rats was found to increase with the length of the test. This result was contrary to that of Norris and Church (*J. Nut.* 5 (1932), 495). The probable error of an estimation was determined for groups of ten buck or ten doe for each week. The error was found to decrease rapidly up to the third week and then very slowly. The values for the probable error of a result at three weeks were 21 per cent above or 18 per cent below the true value for buck and 30 per cent above or 23 per cent below the true value for doe. The corresponding figures for a five weeks test were 17 per cent above or 15 per cent below the true value for buck and 24 per cent above or 19 per cent below the true value for doe. The author therefore maintains that the increase in accuracy would not in general justify the extra expenditure of time and labor.—K. H. Coward, The Pharmacological Laboratories of the Pharmaceutical Society (*Biochem. J.*, 27 (1933) 445).

## OBITUARY

### HENRY G. GREENISH

Prof. Henry G. Greenish, *honorary member* of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1913, died at his home Willesden Green, London, England, on August 2nd, aged 78 years. He was the son of the late Thomas Greenish, president of the British Pharmaceutical Society in 1880–1882 and of the British Pharmaceutical Conference in 1886. The son, Henry G., was apprenticed to his father; he won a Bell scholarship in 1875 and in 1876–1877 earned five silver medals in addition to that of the Society. After passing the Major examination he was for a time demonstrator in the School of the British Pharmaceutical Society. He continued his studies at the Universities of Dorpat and Vienna and returning to his *Alma Mater*, was appointed a lecturer (1890) and professor in 1893. The office of Dean of the School and Professor of Pharmacutics was established a few years later, and on the recognition of the School by the University of London he became its Professor of Pharmaceutics.

Professor Greenish took an active part in the revisions of the British Pharmacopœia for 1898 and 1914, and was joint editor of the latter. He was a member of the Commission set up in connection with the preparation of the British Pharmacopœia 1932.

In 1911 with Sir William S. Glyn Jones he toured Continental countries in order to gain information on the working of health insurance systems. During the World War he was frequently called upon by the Government with problems submitted by various departments.

He was author of *A Text Book of Pharmacognosy*, now in its sixth edition, *'The Microscopical Examination of Foods and Drugs'* and (in collaboration with the late M. Collin) of an *Anatomical Atlas of Vegetable Powders*, his work in connection with the British Pharmaceutical Codex extended over many years and from 1891 to 1926 the

*'Year Book of Pharmacy'* bears witness to his varied research. Dr. Greenish was president of the British Pharmaceutical Conference in 1922, the year of his silver wedding. In 1917 he received the Hanbury Medal and in 1920 the University of Paris conferred on him the honorary Doctor's degree.

## EDITORIAL NOTES

### THE PHARMACOPŒIA WILL ESTABLISH AN OFFICIAL METHOD FOR PREPARING PERCENTAGE SOLUTIONS

The following is taken from the report of Chairman E F Cook, presented at the annual meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION held in Madison

The correct method for preparing a percentage solution for medicinal use has long been in dispute. Some authorities have always insisted upon using the "weight-weight" (w/w) method as the only correct procedure. Others have argued with equal insistence that the "weight-volume" (w/v) method was the only practical plan. The new British Pharmacopœia has led the way to make the practice in drug stores uniform by prescribing an official method as follows:

#### PERCENTAGE SOLUTIONS

'In defining standards, the expression 'per cent' is used according to circumstances with one of three different meanings. In order that the meaning to be attached to the expression in each instance may be clear, the following notation which has long been in use by pharmacists has been adopted:

*Per cent w/w, percentage, weight in weight,* expresses the number of Gm of active substance in 100 Gm of product.

*'Per cent w/v, percentage weight in volume,* expresses the number of Gm of active substance in 100 millilitres of product.

*Per cent v/v, percentage volume in volume,* expresses the number of millilitres of active substance in 100 millilitres of product.

The strengths of solutions of solids in liquids are expressed as percentage weight in volume, of liquids in liquids as percentage volume in volume, and of gases in liquids as percentage weight in weight.

In the dispensing of prescriptions, when the expression per cent is used without qualification it is to be interpreted to mean, for solutions of solids in liquids, per cent weight in volume, for solutions of liquids in liquids, per cent volume in volume, for solutions of gases in liquids, per cent weight in weight. Thus, a '10 per cent' or a '1 in 10' solution is prepared by dissolving 10 Gm of a solid, or 10 millilitres of a liquid, in sufficient of the solvent to make 100 millilitres. A solution of the same strength may be prepared on the

Imperial System, and on the Apothecaries System, by dissolving 44 grains (more precisely 43.847 grains) of a solid, or 48 minims of a liquid, in sufficient of the solvent to make 1 fluidounce (480 minims) of solution."

Our own Committee of Revision, after discussion, voted at the recent Conference to introduce a similar paragraph in the new Pharmacopœia.

### THE REVISION OF THE FOOD AND DRUGS ACT IN ITS RELATION TO THE U S P

No one can now predict the final form in which the rewritten Federal Food and Drugs Act may be passed by Congress or when that may occur, but it is of the utmost importance to the work of our Committee and to the future of the United States Pharmacopœia that it should retain essentially the status proposed in the first draft offered to Congress by the Secretary of Agriculture, and introduced into both the Senate and the House.

The added recognition of Pharmacopœial standards, covering as it does the U S P and N F definitions, descriptions, formulas, tests, assays and the packaging and labeling specifications places greatly increased responsibility upon the decisions of the U S P Revision Committee.

The 'variation clause' is retained to meet the legitimate need for modifications in official products, such as the demand for a "Half-Strength or Double-Strength Ointment of Mercuric Oxide," "Half-Strength Tincture of Iodine," etc., and to allow the sale of products of technical grade and also to permit the sale of established preparations differing in flavor, color or strength from the official. However, the new requirement will compel a labeling which clearly indicates wherein the unofficial product differs in strength, quality and purity from the specifications of the Pharmacopœia or National Formulary. This has not been a part of the law heretofore.

The feature which authorizes the secretary to prescribe additional tests or assay methods to determine whether or not the official standards are being complied with, should it be found necessary, is entirely new.

This, however, greatly strengthens the position of the Pharmacopœia for no vital objective or responsibility of our Committee

is disturbed and the enforcement of the necessary standards, which our Committee have established is helped. The first duty of the Committee of Revision is to decide the scope of the new Pharmacopœia, that it may represent the therapeutic agents of the day believed to be worthy of recognition. This duty remains exclusively in our hands.

#### ACCURACY OF VITAMIN A TEST IN RELATION TO DURATION OF TEST

By a statistical examination of the results of 201 vitamin A tests, the accuracy of such tests for a period of dosing of one to five weeks was determined. The experiments were carried out by the usual method of feeding rats on a diet deficient in vitamin A until they ceased to grow and then giving in addition doses of the substance under examination for a period of five weeks. The results were calculated from the responses of the rats alive at the end of each week of the test, 1129 buck and 1232 doe were alive at the end of the first week and 960 buck and 1110 doe at the end of the fifth week. The curves relating increase in weight to dose of vitamin A given were found to be approximately logarithmic for each week as would be expected from those previously published for five weeks' growth.

The standard deviation of the increase in weight of these rats was found to increase with the length of the test. This result was contrary to that of Norris and Church (*J. Nut.* 5 (1932), 495). The probable error of an estimation was determined for groups of ten buck or ten doe for each week. The error was found to decrease rapidly up to the third week and then very slowly. The values for the probable error of a result at three weeks were 21 per cent above or 18 per cent below the true value for buck and 30 per cent above or 23 per cent below the true value for doe. The corresponding figures for a five weeks' test were 17 per cent above or 15 per cent below the true value for buck and 24 per cent above or 19 per cent below the true value for doe. The author therefore maintains that the increase in accuracy would not in general justify the extra expenditure of time and labor.—K. H. Coward. The Pharmacological Laboratories of the Pharmaceutical Society (*Biochem. J.*, 27 (1933), 445).

## OBITUARY

### HENRY G. GREENISH

Prof. Henry G. Greenish, *honorary member* of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1913, died at his home Willesden Green, London, England, on August 2nd, aged 78 years. He was the son of the late Thomas Greenish, president of the British Pharmaceutical Society in 1880-1882 and of the British Pharmaceutical Conference in 1886. The son Henry G. was apprenticed to his father; he won a Bell scholarship in 1875 and in 1876-1877 earned five silver medals in addition to that of the Society. After passing the Major examination he was for a time demonstrator in the School of the British Pharmaceutical Society. He continued his studies at the Universities of Dorpat and Vienna and returning to his *Alma Mater*, was appointed a lecturer (1890) and professor in 1893. The office of Dean of the School and Professor of Pharmaceutics was established a few years later, and on the recognition of the School by the University of London he became its Professor of Pharmaceutics.

Professor Greenish took an active part in the revisions of the British Pharmacopœia for 1898 and 1914, and was joint editor of the latter. He was a member of the Commission set up in connection with the preparation of the British Pharmacopœia 1932.

In 1911, with Sir William S. Glyn Jones he toured Continental countries in order to gain information on the working of health insurance systems. During the World War he was frequently called upon by the Government with problems submitted by various departments.

He was author of *A Text Book of Pharmacognosy*, now in its sixth edition. 'The Microscopical Examination of Foods and Drugs,' and (in collaboration with the late M. Collin) of an *Anatomical Atlas of Vegetable Powders*, his work in connection with the British Pharmaceutical Codex extended over many years and from 1891 to 1926 the *Year Book of Pharmacy* bears witness to his varied research. Dr. Greenish was president of the British Pharmaceutical Conference in 1922, the year of his silver wedding. In 1917 he received the Hanbury Medal and in 1920 the University of Paris conferred on him the honorary Doctor's degree.

## PERSONAL AND NEWS ITEMS

Wayland D Wilcox, of Philadelphia described the trip to the Dells of the Wisconsin River and the Indian Pageant in verse and in like manner expressed appreciation of the entertainment given at the home of Dr and Mrs Edward Kremers

Mrs Adolph Menges and the members of the Ladies Auxiliary carried out the entertainment programs most successfully Mr Menges could not participate actively in the program on account of poor health, but was greatly interested in all events Appropriate resolutions adopted by the ASSOCIATION speak for the enjoyment given to the members and this mention is made for all who so splendidly contributed to the hospitalities and entertainment features

Baltimore and Maryland were largely represented at the meeting while this exhibited the interest of the members in the ASSOCIATION, it was also expressive of their friendship for President R L Swain and others of the official family

The fraternities and a number of the colleges gathered around the festive board and renewed acquaintances

Mathias Noll, Kansas historian, sent his history of Kansas pharmacy for inspection to the meeting of the Section on Historical Pharmacy The volume is comprehensive and represents the work of years and sets an example for other states to follow

Mississippi Pharmaceutical Association recorded the celebration of its 50th anniversary in a Gold Book

Treasurer Charles W Holton and Mrs Holton have returned from an extended trip covering a large part of Europe

The doctorates conferred by American Universities are reported in *Science* and in the *Journal of Chemical Education*, among these are thirteen degrees in pharmacy and pharmacology

Secretary E L Newcomb, of the N W D A advises druggists to secure from their wholesale druggists Pharmacy week maps for use in their displays

J Leon Lascoff advises that on October 24th a joint meeting of physicians and pharmacists will be held in Hotel Pennsylvania, New York City Each pharmacist will be mailed two tickets and it is expected that one will be used

by the pharmacist and the other is for a physician The purpose is to have equal representation of physicians and pharmacists

Dr Lascoff also reports on the NRA Day parade participated in by pharmacists, among them were a number of veterans well over 70 years of age, Dr Schleussner, who has passed the 84th milestone persisted in marching, but was persuaded to leave the procession at 52nd Street after having marched more than a mile

Dr H H Rusby has published a book on *Jungle Memories* Comment on this book will be made in a later issue of the JOURNAL

Dr B V Christensen has been appointed director of the School of Pharmacy University of Florida, Dr Townes R Leigh was named dean of the College of Arts and Sciences following the merger of the College of Pharmacy with the College of Arts and Sciences

John F McCloskey succeeds Prof J J Grasser as dean of Loyola College of Pharmacy, New Orleans

Prof Julius Stieglitz, of the University of Chicago, has announced his retirement from administrative work of conducting the chemistry department of the university to devote his time entirely to research work A dinner in his honor was given September 11th by former students and leading chemists in the United States and foreign countries

The formal award of the Remington Honor Medal to Secretary E F Kelly, A Ph A, will be made on Oct 11th at the New York College of Pharmacy A dinner at 6 00 P M will precede the presentation for which an interesting program has been prepared A large attendance is expected, for further information address Secretary Rudolph O Hauck, 113 68th St, New York City

## CANADIAN PHARMACEUTICAL ASSOCIATION

The twenty first annual meeting of the Canadian Pharmaceutical Association, which opened on Tuesday morning, August 22nd was one of the best attended conventions ever held in the history of the Association The druggists turned out in good numbers at every session, and showed keen interest in every paper and problem presented

One of the special features of the Luncheon on Tuesday August 22nd was the presentation of a Scroll to Prof V E Henderson, Toronto enrolling him as an *Honorary Member* of the C Ph A



## SOCIETIES AND COLLEGES

## LIST OF REGISTRANTS ANNUAL MEETING A PH A, MADISON, WIS

Corrections and additions are respectfully requested, a number, evidently, failed to sign the official Registration Book, the names are given as recorded. Please address JOURNAL AMERICAN PHARMACEUTICAL ASSOCIATION 10 W Chase St, Baltimore, Md. A second list will be published in the October JOURNAL.

ALBERS C CLARENCE Austin Texas  
ALLAN CLARE F Wyandotte Mich  
AMES HAZEL I Medford Mass  
AMRIEIN FLORIN J Brookline Mass  
ANDERSON OLIVE G Indianapolis Ind  
ANDREWS MARVIN J Baltimore Md  
ARNY H V New York N Y

BACON FRANKLIN J Cleveland Ohio  
BALDINGER LAWRENCE H South Bend Ind  
BALLARD C W Mr. and Mrs Mt Vernon N Y  
BALLET J C Lehigh N Car  
BANG HAAALAN Pullman Wash  
BATTERSHILL R R Chicago Ill  
BAUER JOHN C Baltimore Md  
BEAL GEORGE D Pittsburgh Pa  
BENEZRA LENA Miss Madison Wis  
BERG FRANTZ F Floral Park N Y  
BIBBINS F C Indianapolis Ind  
BLACKALL GEORGE Bristol Conn  
BRADLEY THEODORE J Boston Mass  
BRADLEY THEODORE Boston Mass  
BRAKKE M N McVie N Dak  
BROWN CLARENCE Columbus Ohio  
BROWN HENRY Scranton Pa  
BUCH HARRY H Harrisburg Pa  
BUDINGER MRS CAROLINE Williamsport Pa  
BUNNY F S Lincoln Nebr  
BUNTING GEORGE A Baltimore Md  
BURLAGH H M Mrs Chapel Hill N Car  
BURNIAC JOSEPH J Detroit Mich  
BURT JOSEPH B Lincoln Nebr

CAIN RUSSELL A Mr. and Mrs Seattle Wash  
CANIS O P M New York City  
CARR C JELLEFF Baltimore Md  
CASPARI CHARLES E St Louis Mo  
CHEDIAK MILA A Cedar Rapids Iowa  
CHILDS MAC E Dorado Kansas  
CHRISTENSEN B V Gainesville Fla  
CLARK RALPH W Madison Wis  
CLAUS EDWARD P Pittsburgh Pa  
CLAYTON CHARLES J Denver Colo  
COLE B OLIVER Baltimore Md  
COLLINS GEORGE W Chicago Ill  
COMES D E Los Angeles Calif  
COOK E FULLERTON Philadelphia Pa  
COOK ROY B Charleston W Va  
CONPER ZADA M Iowa City Iowa  
COSTELLO P H Cooperstown N Dak  
CULTER S H Tuckaboe N Y  
CURRY G L Louisville Ky

DAVY EDWARD D Cleveland Ohio  
DAY WM H Chicago Ill  
DEBLANO FRANK A Mr and Mrs Washington D C  
DEKAY H GEORGE La Fayette Indiana  
DILLIE JAMES M Omaha Nebr  
DOHME A R L Baltimore Md  
DUHMEZ A G Mr and Mrs Baltimore Md  
DUNNING H A B Mr. and Mrs Baltimore Md  
DURHAM EARL E Corunna Mich  
DYB C A. Columbus Ohio  
DYNIWICZ HATTIE Oak Park Ill

EBERLE E G Mr and Mrs Baltimore Md  
EBY FRANK H Springfield Pa  
EDWARDS LEROY D Cleveland Ohio  
ENSMOE C T Brookings S Dak  
EMANUEL LOUIS Pittsburgh Pa

FANTUS BERNARD Chicago Ill  
FERRING LAWRENCE Mr and Mrs New Orleans La  
FINNERAN J F Everett Mass  
FISCHER RICHARD P Trenton N J  
FISHER CHESTER I Pittsburgh Pa  
FOOTE P A Gainesville Florida  
FUHRMANN CHARLES J Washington D C

GALLOWAY J EARLE Des Moines Iowa  
GARVIN ALICE ESTHER New Haven Conn

GATHERCOAL E N Chicago Ill  
GAUGER CHARLES H Buffalo N Y  
GILBERT C T Noroton Conn  
GILL JAMES J Providence R I  
GLAVER WM H Lawrence Mass  
GOLDNER KARL Minneapolis Minn  
GRAHAM KATHARINE Madison Wis  
GRAY WM Chicago Ill  
GUSTAFSON CHARLES JR. Hartford Conn

HAMMOND E I University Miss  
HARGREAVES GEORGE W Auburn Ala  
HARRIST M J Brooklyn N Y  
HARRIS L E Norman Okla  
HARRISON HARRY S Baltimore Md  
HAYDENHILL L D Mr and Mrs Lawrence Kans  
HAYDEN EMIL A Madison Wis  
HAYMAN J LESTER Morgantown W Va  
HAHN HENRY F San Antonio Texas  
HENRY M NORTON Lowell Mich  
HILL OLIN E Clinton Iowa  
HILTON S L Mr and Mrs Washington D C  
HOOD OSCAR I Rockford Ill  
HUSA W J Gainesville Florida

IRELAND EDWARD J Madison Wis

JACOBS M L Chapel Hill N Car  
JALINEL P St Paul Minn  
JENKINS GLENN L Mr and Mrs Baltimore Md  
JEPSON P J Newton Iowa  
JOHNSON D B R Norman Okla  
JOHNSON HENRY S New Haven Conn  
JONES D F Watertown S Dak  
JONES ROWLAND Gettysburg S Dak  
JORNAN C B La Fayette Ind  
JUSTICE RONNART S Columbus Ohio

KAGY E O Des Moines Iowa  
KINIPICK NAOMI Eagle Grove Iowa  
KIRBY FRANK B Chicago Ill  
KOCH J A Mr and Mrs Pittsburgh Pa  
KATTE B J Cincinnati Ohio  
KRAVWELL G V Racine Wis  
KRAFT H E Milwaukee Wis  
KRANTZ J C Jr Baltimore Md  
KRUMWIEBE H A New Brunswick N J

LAKES ROLAND T Detroit Mich  
LANGEVIN MARY Lincoln Nebr  
LANWIRMEYER CHARLES F Waukegan Ill  
LARSON MARTIN Andover S Dak  
LEE C O W La Fayette Ind  
LEE JOHN E Pittsburgh Pa  
LEIGH TOWNES R Gainesville Fla  
LEWIS HENRY Mr and Mrs Madison Wis  
LIMBERGER MAX N Milwaukee Wis  
LINNAHL W W Pullman Wash  
LINK ALFRED Mr and Mrs Madison Wis  
LITTLE ERNEST Highland Park N Y  
LUDWIG ANDREW F Baltimore Md  
LYMAN RUFUS A Lincoln Nebr  
LYNN E V Mr and Mrs Seattle Wash

MCCARTNEY FRANK L Chicago Ill  
MCCLOSKEY JOHN F New Orleans La  
MCCULLOUGH F V New Albany Ind  
MCSHANE O W Poultney Vt  
MALLBY A F Madison Wis  
MEISSNER F W La Porte Ind  
MERRELL CHARLES C Cincinnati Ohio  
METCALFE E F Minneapolis Minn  
MUNN B L Chicago Ill  
MURRISON S W Chicago Ill  
MUIR J D Grand Rapids Mich

NELSON CARL E Hammond Ind  
NETZ C V Minneapolis Minn  
NEWCOMB E L Mr and Mrs Montclair N J  
NEWCOMB LOIS, Miss Montclair N J

NIE H J MR AND MRS Kansas City Mo  
 NILES E H Indianapolis Ind  
 NITARDY F W Brooklyn N Y  
 NORDRUM O M St Paul Minn

O CONNELL C LEONARD Pittsburgh Pa  
 OLOENBURG MRS Madison Wis  
 OLSEN PAUL C Philadelphia Pa  
 OLSON LIONEL A Madison Wis  
 OSOL ARTHUR Philadelphia Pa

PARKIN C A MR AND MRS Madison Wis  
 PHILIP W BRUCE MR AND MRS Washington D C  
 PIERCE CHARLES MR AND MRS Springvale Me  
 PITTSBURGER PAUL S Philadelphia Pa  
 POERSTEL MRS HELEN LEE Washington D C  
 PROUT W A MR AND MRS Charleston S Car  
 PROUD W ARTHUR Baltimore Md

RAABE RUDOLPH MR AND MRS AND DAUGHTER Ada Ohio

RANG KARL H Oshkosh Wis  
 REESE ROY C MR AND MRS Topeka Kans  
 REIF EDWARD C Pittsburgh Pa  
 RENYENHOMI OSCAR Madison Wis  
 RICHARDS L W Missoula Mont  
 RICHTMANN W O Madison Wis  
 RIDER T H Cincinnati Ohio  
 RISING L W MR AND MRS Newark N J  
 RICHIE LUCILE Cincinnati Ohio  
 RIVARD W HENRY Providence R I  
 ROGERS C H Minneapolis Minn  
 ROBIN JOSEPH Rahway N Y  
 ROTHROCK RUSSELL B Evansville Ind  
 ROWE LEWIS W Detroit Mich  
 RUDDO W F Richmond Va  
 RUDY H R Hagerstown Md  
 RUENZEL H G Milwaukee Wis  
 RUSSELL OSCAR E Elkhart Ind

SANTILLI M A Milwaukee Wis  
 SASS H A Redfield S Dak  
 SAWIERS MABELLE M Oakland Calif  
 SCHAEFER F C A Brooklyn N Y  
 SCHAEFER HUGO New York City  
 SCHICKS G P Newark N J  
 SCHLICHTING A F St Louis Mo  
 SCHLICHTING HAROLD E Lansing Mich  
 SCHMITZ E C Plattville Wis  
 SCHNAIDT H J Parkston S Dak  
 SCHOETZOR R E Brooklyn N Y  
 SCHRAM W H Hillsboro N Dak  
 SCHWARZ A JOHN Memphis Tenn  
 SCOTT S M JR Charleston W Va  
 SLAMA FRANK J Baltimore Md  
 SLOCUM J W Indianapolis Iowa  
 SMITH F A UPSHUR St Paul Minn  
 SNOW CLYDE M MR AND MRS Oak Park Ill  
 SNOOK J P Norwich N Y  
 SONDERG C W MR AND MRS Cincinnati Ohio  
 SPRAGUE CHARLES Omaha Nebr  
 SPRAGUE WM Omaha Nebr  
 STANLEY EMERSON D MR AND MRS Madison Wis  
 STENSH A E Cambridge Wis  
 STEVENS ASA N Indianapolis Ind  
 STOCKING C H Ann Arbor Mich  
 STRAUSS C H Calumet Mich  
 STROUD HENRY J JR Pittsburgh Pa  
 STROUD F P Philadelphia Pa  
 STUHR ERNEST T Corvallis Ore  
 SULTAN FRED St Louis Mo  
 SWAIN R L MR AND MRS Baltimore Md  
 SWAIN R L JR Baltimore Md  
 SWANSON E E Indianapolis Ind

TAYLOR F O Detroit Mich  
 TEETERS W J Iowa City Iowa  
 TERRY RALPH E Elmhurst Ill

UHL ARTHUR Madison Wis

WALEMAN NELLIE Madison Wis  
 WALTON L L MR AND MRS Williamsport Pa  
 WEAVER E R JR Stillwater Okla  
 WEBSTER G L Chicago Ill  
 WEISS RICHARD G MR AND MRS Madison Wis  
 WHEELER C B Hudson Mass  
 WHITNEY H A K Ann Arbor Mich  
 WILEY W D Philadelphia Pa  
 WILM RAYMONO K Milwaukee Wis  
 WILSON ROBERT C Athens Ga  
 WYNN A L I Richmond Va  
 WRUBLE MILTON Detroit Mich

YOUNGKEN HEBER W Boston Mass

ZOFF L C Iowa City Iowa  
 ZUFALL, C J La Fayette Ind

## A PH A NOMINEES FOR 1934-1935

For President Robert P Fischelis Trenton N J, J W Slocum Indianola, Ia, Gordon L Curry, Louisville Ky

For Vice-President George D Beal, Pittsburgh, Pa, C Leonard O'Connell Pittsburgh Pa, Edward Spease Cleveland Ohio

For Second Vice President Oscar Rennebohm, Madison Wis, Mac Childs, El Dorado Kas, Roy B Cook, Charleston, W Va

For Members of the Council Ambrose Hunsberger, Philadelphia, S L Hilton Washington, D C, H A B Dunning Baltimore, Edward Kraus, Ann Arbor Mich, John C Krantz, Jr Baltimore, W Bruce Philip Washington, D C Thomas Roach Oklahoma City, Okla, E N Gathercoal Chicago R C Wilson, Athens, Ga

## SYMPOSIUM ON PRACTICING PROFESSIONAL PHARMACY

Interesting exhibits of U S Pharmacopoeia National Formulary and A Ph A Recipe Book products and revision methods were prepared by the respective chairmen. These were further described in a symposium at the Second General Session of the Association.

### PART I MEETING THE PHARMACEUTICAL NEEDS OF THE PRACTICING PHYSICIAN

The Foundations of Success for Professional Pharmacy E Fullerton Cook. Extending the Use of Official Products E N Gathercoal. The Purpose and Influence of the 'New and Non official Remedies' The Value of the A Ph A Recipe Book J Leon Lascoff, The Growth of Professional Pharmacy C B Jordan, Cooperation between Physicians and Pharmacists of the Northwest George Bender. The Finds Concerning Professional Pharmacy in St Louis, Frank A Delgado, Pharmacology in the Medical Curriculum and the United States Pharmacopoeia, John C Krantz, Jr, 'Selling' Professional Service Anton Hogstad Jr

### PART II THE HOSPITAL PHARMACY

The Western Reserve University Plan for Hospital Pharmacies, Edward Spease. The Hospital Formulary, Robert A Hatcher and Wendell J Stansby, The Benefits to a Hospital through Efficient Pharmaceutical Service, Harry E Bischoff

The exhibits and the symposium received the hearty approval of the membership and it is hoped that the chairmen will continue the plan at succeeding meetings and carry out such publicity at other state and national conventions

## STATE ASSOCIATION MEETINGS

### NEW HAMPSHIRE

New Hampshire Pharmaceutical Association held its annual session at Rye Beach and carried out a very successful program. Many visitors were present and several delivered interesting addresses dealing with timely subjects, among them Congressman Charles W. Tobey.

The following officers were elected for the ensuing year: *President* Leo L. Desparte, Lebanon; *First Vice President* George Moulton, Peterboro; *Second Vice President*, William Ryan, Keene; *Third Vice President*, Lawrence Cate, Rochester; *Secretary* Rodney A. Griffin, Franklin; *Treasurer* Edgar E. Goulet, Manchester; *Auditor* Herbert E. Rice, Manchester; *Delegate to the N. A. R. D.*, Ernest L. Putnam, Concord.

The retiring president E. L. Putnam was presented with a handsome traveling case and Secretary Rodney A. Griffin with a desk lamp.

### VERMONT

Vermont Pharmaceutical Association met at Lake Bomoseen, June 25th-27th. Resolutions were passed suggesting that all national associations, of the drug industries, devise and adopt a constructive measure as a substitute for existing Federal and State special and ruinous and commodity taxes for presentation to Congress and to State legislatures. The following officers were elected for the ensuing year: *President* Laurence W. Leonard, Randolph; *First Vice President* H. E. Colman, Barre; *Second Vice President*, George F. Donovan, Fair Haven; *Third Vice President* J. W. Blakely, Montpelier; *Secretary-Treasurer*, Welcome B. Eastman, St. Johnsbury.

### WASHINGTON

Washington Pharmaceutical Association held its annual convention at Sunrise Lodge on Mt. Rainier, June 26th to 28th. The following officers were elected: *President* F. R. Robertson, Spokane; *Secretary*, Harry W. Ayres, Seattle; *Treasurer*, Graham A. Conde, Seattle; *District Governors*, Charles Graham

Bellevue, Stanton Hall, Everett; Guy C. Norton, Tacoma; Carlton Sears, Olympia; George Sears, Chchals; Dayton Garrison, Centralia; Jerry Patton, Longview; R. W. Reder, Vancouver; William Desmond, Aberdeen; Earl Brown, Bremerton; Murray Brown, Yakima; N. B. Krause, Walla Walla; Ray Price, Spokane; William Gray Wilbur, J. E. Brayton, Sequim.

Discussion and adoption of an NRA code was an outstanding part of the program. Prof. C. V. Lynn was one of the speakers of the convention.

## THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS

Representatives of the National Association of Retail Druggists met with the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION in Madison. As usual and expected the fraternal and cooperative spirit to serve pharmacy prevailed during these deliberations. The A. P. H. A. is represented at the meeting of the N. A. R. D., in Chicago by delegates including President R. L. Swain and former presidents of the Association. At this writing the sessions of the N. A. R. D. convention have not opened, so this is a greeting accompanied by wishes for a successful meeting. Indications are for a large attendance.

## ANNUAL MEETING OF THE AMERICAN PHARMACISTS ASSOCIATION, INC.

The keynote of the convention was the establishment of closer relations between physicians and pharmacists of Northern California. Among the speakers of the medical profession were Dr. Langley Porter, dean of the University of California Medical School; Dr. Harold Fraser of the San Francisco County Medical Society; and Dr. Samuel Goldman, member of the San Francisco Health Council. The pharmacists were represented by a number of outstanding members, among them, Leo Mattes, president of the California Board of Pharmacy; George Harrison Frates, former president of the California Pharmaceutical Association; President Waldemar Gnerich, of the California Northern Retail Druggists Association; Professor Frank T. Green, Congresswoman Florence P. Kahn; President Edna Gleason of the California Pharmaceutical Association; John Culley; Dr. T. C. Daniels, of the College of Pharmacy; Dr. W. C. Flemming, of the College of Dentistry.

A Pan Pacific Conference of pharmacists is planned and it was voted to establish an honorary group to be known as the American College of Apothecaries

### NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION

In a special bulletin designated as the Hoosier Listening Post," Carl F G Meyer, president of the National Wholesale Druggists' Association presents a message to the membership urging all to make every endeavor to attend the Association's annual convention which will be held at French Lick Springs Ind., October 1 to 5, inclusive President Meyer pointed out that there will be many subjects vital to the drug industry discussed at the meeting

### FEDERAL WHOLESALE DRUGGISTS' ASSOCIATION

Containing a large number of special papers by individuals and reports from committees on a wide variety of subjects of importance to the Association in particular and to the drug trade generally the program for the eighteenth annual convention of the Federal Wholesale Druggists' Association has been completed and made public by Secretary R E L Williamson of Baltimore The meeting, which will be held September 25th 26th and 27th at the Stevens Hotel Chicago will have morning and afternoon business sessions on Monday and Tuesday with the annual banquet on Tuesday

### BOOK NOTICES AND REVIEWS

*Urine and Urinalysis* By LOUIS GERSHENFELD, Ph M B Sc P D Professor of Bacteriology and Hygiene and Director of the Bacteriological and Chemical Chemistry Laboratories at the Philadelphia College of Pharmacy and Science Fabrikoid Price \$2.75 Pages 272 with 36 illustrations Philadelphia Lea & Febiger, 1933

The author states in the preface that the book is intended for those who do not wish to invest in more elaborate and expensive texts in physiological chemistry Although it is true that most of the material found in this text can be obtained in the more comprehensive texts the present work offers some advantages The treatment of each laboratory test indicates that the author has had considerable personal experience with the material under consideration

The section concerned with the qualitative tests is especially good The usual as well as the unusual urinary constituents are carefully considered

The sections devoted to the microscopic examination of urinary sediments contain practically the same material that is to be found in the standard texts of clinical laboratory methods The standard procedures for the study of kidney function are well described

On the whole much valuable information on urine is brought together in this one small volume—A A CHRISTMAN

*Recent Developments in the Preparation and Use of Thallium* is the subject of an exceptionally informative and important contribution on this relatively little known and rather scarce mineral which paper appears in the June issue of 'Foote-Prints' the house magazine of the Foote Mineral Company, Philadelphia The article is by Dr James C Munch an authority on thallium and one of the first to introduce thallium compounds into rodenticidal use Numerous photographs illustrate the article which contains a wealth of data as to the history of thallium, together with discussions of its technical natural and its scientific uses Copies of the issue containing the article may be had by addressing the Foote Mineral Company, Sixteenth and Summer Streets Philadelphia

### CODE PRICE CONTROL PROVISIONS

Deputy Administrator Whiteside, on September 20th presented the Retail Code to General Johnson for his consideration and it has been given to the Press The drug code would be handled by a Retail Drug Trade authority, to be provided in which the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists are represented and other associations to be designated by the NRA

In addition to the trade practices set forth in Article IX all drug retailers shall comply with the following

(a) No drug retailer shall substitute another article or any part thereof for the kind ordered without due notice to and consent of the customer

(b) No drug retailer shall advertise to fill prescriptions at a uniform price irrespective of cost of ingredients or quantity prescribed

(c) No drug retailer shall permit any demonstrator or sales employee whose salary is wholly or partially paid by a manufacturer or distributor to work in his establishment unless such demonstrator or sales employee is clearly and openly identified as the agent of such manufacturer or distributor

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXII

OCTOBER 1933

No 10

## ROBERT LEE SWAIN

The president of the AMERICAN PHARMACEUTICAL ASSOCIATION, Robert Lee Swain, is a native of Delaware. He was born September 29, 1887, at Redden, Sussex County, son of the late Rev C P Swain and Martha H (Messick) Swain. He received his earlier education in Delaware and is a graduate of Dover High School. Soon after graduating in pharmacy from the University of Maryland, School of Pharmacy, Dr Swain purchased a drug store in Sykesville, which he conducted until 1927, when other duties made it necessary to dispose of it.

In 1920, upon recommendation of Maryland Pharmaceutical Association, Dr Swain was appointed a member of the State Board of Pharmacy by Governor Albert C Ritchie and reappointed by him in 1925, since that time he has served as its secretary-treasurer. He was elected Deputy Food and Drug Commissioner in 1922 and has been continued in that important office since that time.

Dr Swain has been deeply interested in and associated with pharmaceutical organizations during all of his professional life—in local, state and national affairs relating to the promotion and advancement of pharmacy. He is a member of the Maryland Pharmaceutical Association and editor of its official publication the *Maryland Pharmacist*.

President Swain became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1909, the year of his graduation, and served for two years as president of the Baltimore Branch. He was elected vice-chairman of the House of Delegates, A Ph A, in 1928, and chairman in 1929. The experience gained in his duties on the Board of Health suggested to him the need for closer contacts between pharmaceutical enforcement officials of the several states. This led to the organization of the Conference of Pharmaceutical Law Enforcement Officials in 1929, of which he was elected first chairman and reelected since then. He has been a member of and a chairman of important committees within the ASSOCIATION and of associated and related organizations. His work for securing a Pharmacy Corps in the U S Army and, more recently, his efforts on the provisions of the NRA Code for and in behalf of pharmacy and pharmacists, and those served, have received well-earned com-

A Pan-Pacific Conference of pharmacists is planned and it was voted to establish an honorary group to be known as the American College of Apothecaries

#### NATIONAL WHOLESALE DRUGGISTS' ASSOCIATION

In a special bulletin designated as the "Hoosier Listening Post," Carl F G Meyer, president of the National Wholesale Druggists' Association, presents a message to the membership urging all to make every endeavor to attend the Association's annual convention which will be held at French Lick Springs, Ind., October 1 to 5, inclusive. President Meyer pointed out that there will be many subjects vital to the drug industry discussed at the meeting.

#### FEDERAL WHOLESALE DRUGGISTS' ASSOCIATION

Containing a large number of special papers by individuals and reports from committees on a wide variety of subjects of importance to the Association in particular and to the drug trade generally, the program for the eighteenth annual convention of the Federal Wholesale Druggists' Association has been completed and made public by Secretary R E L Williamson, of Baltimore. The meeting, which will be held September 25th, 26th and 27th at the Stevens Hotel, Chicago, will have morning and afternoon business sessions on Monday and Tuesday with the annual banquet on Tuesday.

#### BOOK NOTICES AND REVIEWS

*Urine and Urinalysis* By LOUIS GERSHENFELD, Ph M., B Sc., P D. Professor of Bacteriology and Hygiene and Director of the Bacteriological and Clinical Chemistry Laboratories at the Philadelphia College of Pharmacy and Science. Fabrikoid Price \$2.75. Pages 272 with 36 illustrations. Philadelphia: Lea & Febiger, 1933.

The author states in the preface that the book is intended for those who do not wish to invest in more elaborate and expensive texts in physiological chemistry. Although it is true that most of the material found in this text can be obtained in the more comprehensive texts, the present work offers some advantages. The treatment of each laboratory test indicates that the author has had considerable personal experience with the material under consideration.

The section concerned with the qualitative tests is especially good. The usual as well as the unusual urinary constituents are carefully considered.

The sections devoted to the microscopic examination of urinary sediments contain practically the same material that is to be found in the standard texts of clinical laboratory methods. The standard procedures for the study of kidney function are well described.

On the whole, much valuable information on urine is brought together in this one small volume.—A A CHRISTMAN

*Recent Developments in the Preparation and Use of Thallium* is the subject of an exceptionally informative and important contribution on this relatively little known and rather scarce mineral, which paper appears in the June issue of "Foote-Prints," the house magazine of the Foote Mineral Company, Philadelphia. The article is by Dr James C Munch, an authority on thallium, and one of the first to introduce thallium compounds into rodenticidal use. Numerous photographs illustrate the article, which contains a wealth of data as to the history of thallium, together with discussions of its technical, natural and its scientific uses. Copies of the issue containing the article may be had by addressing the Foote Mineral Company, Sixteenth and Summer Streets, Philadelphia.

#### CODE PRICE CONTROL PROVISIONS

Deputy Administrator Whiteside, on September 20th, presented the Retail Code to General Johnson for his consideration and it has been given to the Press. The drug code would be handled by a Retail Drug Trade authority to be provided in which the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists are represented and other associations to be designated by the NRA.

In addition to the trade practices set forth in Article IX, all drug retailers shall comply with the following:

(a) No drug retailer shall substitute another article or any part thereof for the kind ordered without due notice to and consent of the customer.

(b) No drug retailer shall advertise to fill prescriptions at a uniform price irrespective of cost of ingredients or quantity prescribed.

(c) No drug retailer shall permit any demonstrator or sales employee whose salary is wholly or partially paid by a manufacturer or distributor to work in his establishment unless such demonstrator or sales employee is clearly and openly identified as the agent of such manufacturer or distributor.

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXII

OCTOBER, 1933

No 10

## ROBERT LEE SWAIN

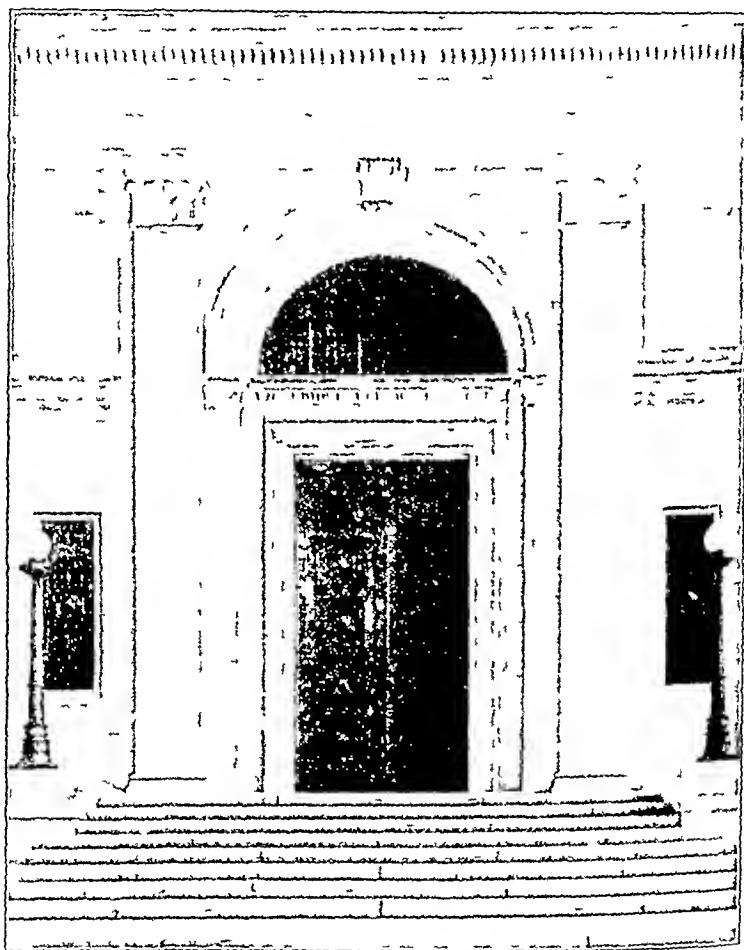
The president of the AMERICAN PHARMACEUTICAL ASSOCIATION, Robert Lee Swain, is a native of Delaware. He was born September 29, 1887, at Redden, Sussex County, son of the late Rev C P Swain and Martha H (Messick) Swain. He received his earlier education in Delaware and is a graduate of Dover High School. Soon after graduating in pharmacy from the University of Maryland, School of Pharmacy, Dr Swain purchased a drug store in Sykesville, which he conducted until 1927, when other duties made it necessary to dispose of it.

In 1920, upon recommendation of Maryland Pharmaceutical Association, Dr Swain was appointed a member of the State Board of Pharmacy by Governor Albert C Ritchie and reappointed by him in 1925, since that time he has served as its secretary-treasurer. He was elected Deputy Food and Drug Commissioner in 1922 and has been continued in that important office since that time.

Dr Swain has been deeply interested in and associated with pharmaceutical organizations during all of his professional life—in local, state and national affairs relating to the promotion and advancement of pharmacy. He is a member of the Maryland Pharmaceutical Association and editor of its official publication the *Maryland Pharmacist*.

President Swain became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1909, the year of his graduation, and served for two years as president of the Baltimore Branch. He was elected vice-chairman of the House of Delegates, A PH A., in 1928, and chairman in 1929. The experience gained in his duties on the Board of Health suggested to him the need for closer contacts between pharmaceutical enforcement officials of the several states. This led to the organization of the Conference of Pharmaceutical Law Enforcement Officials in 1929, of which he was elected first chairman and reelected since then. He has been a member of and a chairman of important committees within the ASSOCIATION and of associated and related organizations. His work for securing a Pharmacy Corps in the U S Army and, more recently, his efforts on the provisions of the NRA Code for and in behalf of pharmacy and pharmacists, and those served, have received well-earned com-

mendations Also, he has gained favorable recognition for his part in recent drug store and prescription surveys, and related work, which promise a better understanding of pharmaceutical and drug-trade activities President Swain earned the degree of Bachelor of Laws from the University of Maryland and is a member of the faculty of Temple University, having been appointed to the Chair of Pharmaceutical Law



Entrance to the American Institute of Pharmacy The dedicatory lines above the entrance read "This building is dedicated to those who have contributed their knowledge and endeavor to the preservation of public health and to the further advancement of science in pharmacy—AMERICAN PHARMACEUTICAL ASSOCIATION"

The first Finnish pharmacies were founded in 1689, an independent institution of pharmacy existed in Sweden, dating back to 1623 There are earlier records in both countries and it is known that the Swedish Court possessed a Court pharmacy during the early part of the 15th century



## EDITORIAL

E G EBERLE, EDITOR

10 West Chase Street, BALTIMORE, MD

### COMPLETION OF THE HEADQUARTERS BUILDING

THE records of the ASSOCIATION show that a home for the organization has been an ideal for many years. A place where its efforts could be consolidated and enlarged and where its valuable records and possessions could be collected and preserved. American pharmacy has lost materially by not having such a central home. The proposal has been considered and discussed on many occasions.

After twelve years of continuous arduous labor the Headquarters Building, the first unit of the American Institute of Pharmacy, is completed and will be occupied before the end of the year. During the interval, very important work has been done for pharmacy, much of which is not apparent. The beautiful building and its splendid location are the visible results and fully justify all the thought and effort and expense that have been so generously given to the undertaking.

Every one interested in pharmacy, either as a profession or as an industry, should carefully read Council Letter No. 3 as printed under "Association Business" of this issue of the JOURNAL. Here is recorded, in brief, the final results of the struggle to erect a headquarters building and to locate it in keeping with the ideals and accomplishments of the profession and the industry.

The Federal Government has shown its confidence in pharmacy on several occasions by entrusting very important duties to the profession. In permitting the ASSOCIATION to occupy this site and in cooperating with it so effectively toward completing the undertaking on a much more splendid basis than had been originally planned, the Government has complimented and assisted pharmacy in a very handsome and practical manner.

To bring all this about has called for much planning and effort and as is usually true of worth-while work, some friction and misunderstanding. Patience and a just cause have brought a most satisfactory result.

The following quotation taken from a letter from Chairman Charles Moore of the Commission of Fine Arts to the secretary indicates that the governmental authorities are also pleased with the result.

"The Commission of Fine Arts at their meeting on October 6, 1933, had pleasure in visiting the headquarters building of the AMERICAN PHARMACEUTICAL ASSOCIATION, designed by John Russell Pope. The Commission can congratulate you and through you, the AMERICAN PHARMACEUTICAL ASSOCIATION, on the successful completion of this difficult and at times perplexing project. The building is an adequate and fitting portion of the frame of the Lincoln Memorial. For the hearty cooperation the ASSOCIATION has shown to bring about this result, this Commission express their appreciation and thanks."

American Pharmacy now has a home beautiful in design and practical in construction, located for its purpose in one of the most commanding and probably the most desirable sites in the national capital. It is in the midst of the several govern-

mental institutions devoted to public health and in a district visited annually by thousands of persons from every section of this nation and from every country in the world

Beyond the utilitarian value of the institution no effort could contribute more to a better understanding of pharmacy and its service to the public and to the stability and strength of the profession

As was reported at the Madison meeting a splendid building and equipment for the Research Laboratories will be furnished by a devoted and generous member of the ASSOCIATION, after the central building is occupied When this is completed, the institution will have a Reference Library, an Historical Museum and a Research Laboratory, as well as working offices for the ASSOCIATION and its related organizations, in keeping with its part in public health and public service

When American Pharmacy dedicates the first building, in 1934, it will not only mark the completion of a splendid undertaking but will, through this equipment and contact, take its rightful place among the public-health professions—E F K.

---

#### THE PRESIDENT'S RESPONSIBILITY AND YOURS

AS president of the AMERICAN PHARMACEUTICAL ASSOCIATION, I recognize and accept the responsibility that goes with this high office I shall do all in my power to uphold the principles to which the ASSOCIATION has long been devoted I shall lend every possible aid and assistance to the advancement of Pharmacy, and to a betterment of the conditions under which the pharmacist carries on his work. It shall be my pleasure to participate as completely as I know how in every plan for the professional and economic uplift of Pharmacy The presidency, as I see it, should be embraced as a great opportunity for serious and careful work

First of all, I shall seek to arouse increased interest in the work of the ASSOCIATION among the pharmacists of the country, to invite a greater number of them to become members, and to urge them to take an active part in its affairs I shall do this because I feel deeply the great need of making pharmacists as a class more familiar with the ideals and principles which have guided the ASSOCIATION through the years There never was a time when pharmacists needed to see things from a more fundamental point of view There is grave danger that Pharmacy may be permanently impaired by unregulated and unrestrained commercial exploitation There are tendencies which must be curbed if Pharmacy is to measure up to its public and professional obligations There are forces which must be subordinated if the drug store is to continue to merit public confidence and esteem The future of the drug store, in my honest and deliberate opinion, depends almost entirely upon its ability to move in the direction the AMERICAN PHARMACEUTICAL ASSOCIATION has from time to time pointed out The ASSOCIATION must be seen in the light of its great service in the past, and as the embodiment of the ideals which must be accepted as a guiding force in the future

The ASSOCIATION should embrace a greater number of retail pharmacists An increase in membership will enhance the value of the work which the ASSOCIATION is doing A larger membership will also put the ASSOCIATION in a stronger position,

and will enable it to do a more effective work While every one looks instinctively to the AMERICAN PHARMACEUTICAL ASSOCIATION to point the right direction, to build professional prestige and to maintain sound professional standards, the ASSOCIATION has not had the numerical strength in keeping with the task it is confidently looked to to perform The inconsistency between the great importance of the work of the ASSOCIATION and the size of its membership constitutes a challenge which must be met

I believe that once pharmacists are made more fully acquainted with the work of the ASSOCIATION they will give it magnificent support With the completion of the headquarters building in Washington, the ASSOCIATION enters upon a career of widened influence and greater usefulness It should be possible to develop the ASSOCIATION so as to include many services which have not been possible heretofore Plans are now being worked out for making the ASSOCIATION more vital to the work of the pharmacist These plans will be greatly aided by increased membership, by more adequate financial support and by a more earnest interest and cooperation upon the part of pharmacists as a class

The AMERICAN PHARMACEUTICAL ASSOCIATION deserves the whole-hearted support of every one interested in the development of Pharmacy on sound professional and economic lines

As president, I earnestly urge you, as members, to cooperate with me in bringing the ASSOCIATION more closely to the attention of the pharmacists of the country Your responsibility is fully as great as mine —ROBERT L SWAIN, *President*

---

#### CRAWFORD W LONG, PHYSICIAN-PHARMACIST, DISCOVERER OF ETHER ANESTHESIA

MANY articles have appeared in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, a number of greater length by the late Joseph Jacobs, an apprentice in the pharmacy of Dr Long in Athens, Ga —on priority of the use of ether anesthesia in surgical operations Reference is made at this time, because in an article of the public press Dr W T G Morton was given the credit which rightly belongs to Dr Long The latter was the first one (1842) to use ether for producing surgical narcosis, the former was the first to demonstrate its use (1846) before a professional gathering Let it be remembered, however, Dr Long performed several surgical operations prior to 1846, in Jefferson, Ga, two on James Venable

Physicians and surgeons of other countries acknowledged Dr Long's priority in the use of ether for anesthesia, for example, when King Edward VII had recovered consciousness after an operation, he asked "Who discovered anesthesia?" The answer which he received from the surgeon was "Dr Crawford Long, Your Majesty"

Dr Long graduated from the University of Georgia in 1835 (then Franklin College), he attended Transylvania University (Lexington, Ky) and graduated from the University of Pennsylvania in 1839 After practicing in New York Hospitals for 18 months, he returned to Georgia (Jefferson) and in 1851 moved to Athens, where he practiced until his demise, June 16, 1878, aged 63 years

## SCIENTIFIC SECTION

BOARD OF REVIEW OF PAPERS—*Chairman*, L W Rowe, George D Beal, F F Berg, C O Lee, E V Lynn, John C Krantz, Jr, Heber W Youngken

### FLUIDEXTRACT OF ERGOT \*

BY L W ROWE AND WILBUR L SCOVILLE

The present paper is a continuation of the work reported to this Section two years ago

In January 1932, a second series of fluidextracts was made from a defatted ergot by the repercolation process. No heat was used in making these fluidextracts

Three menstrua were used, *viz*, Diluted alcohol, 77% alcohol (alcohol 4 vols, water 1 vol) and 87% alcohol (alcohol 9 vols, water 1 vol)

For Series A, 750 cc of Fluidextract was made using Diluted Alcohol. This was divided into three parts, to one of which—labeled "A"—was added sufficient hydrochloric acid to produce a  $p_H$  of 2.85. To a second portion—"A 1"—was added enough tartaric acid to produce a  $p_H$  of 3.15. To the third portion—"A 2"—was added sufficient 50% hypophosphorous acid to produce a  $p_H$  of 2.97.

Each of the above was filled into (8) 1-oz amber-glass bottles, two of which were stored in a refrigerator, and the rest on the laboratory shelf at room temperatures.

The second series corresponds to the first except that the initial fluidextract was made with 77% alcohol as the menstruum, and one-third of the product was adjusted to a  $p_H$  of about 3.0 with hydrochloric acid, the second third with tartaric acid, and the third with hypophosphorous acid, being labeled "B," "B 1" and "B 2."

The third series was similarly made with a menstruum of 87% alcohol, and correspondingly adjusted with the same three acids, and labeled "C," "C 1" and "C 2."

The fourth series, of 300 cc, was also made with a menstruum of 87% alcohol and divided into two portions. The first portion was stored (in 1-oz bottles) without further addition or adjustment and to the second portion was added 0.2% w-v of cysteine hydrochloride. All were stored in 1-oz amber-glass bottles.

Since the main purpose of these experiments was to ascertain the relative stability of the preparations, and the effectiveness of the stabilizing materials used, it was deemed unnecessary to assay, at the beginning, more than one sample of each series, it being assumed that all represented the same percolate. Also each of the B series, and the C series and the D series would be of the same strength, since each was a portion of the corresponding percolate.

At the end of about a year a sample of each was assayed, these samples having been stored at room temperature. The Cock's Comb method of assay was employed in all cases.

The following table summarizes the results

---

\* Scientific Section, A. Ph. A., Madison meeting, 1933

## FLUIDEXTRACT OF ERGOT

Series	Menst	Stabilizing Agent	p <sub>H</sub>	First Assay	Second Assay
A	49% Alc	HCl	2 85	120 %	110%
A1		H <sub>2</sub> Ta	3 15	(120)%	100%
A2		HPH <sub>3</sub> O <sub>2</sub>	2 97	(120)%	120%
B	77% Alc	HCl	2 90	75 %	65%
B1		H <sub>2</sub> Ta	3 18	(75)%	80%
B2		HPH <sub>3</sub> O <sub>2</sub>	3 06	(75)%	80%
C	87% Alc	HCl	2 50	75 %	75%
C1		H <sub>2</sub> Ta	3 35	(75)%	75%
C2		HPH <sub>3</sub> O <sub>2</sub>	3 03	(75)%	65%
D	87% Alc	None	5 60	75 %	75%
D1		Cryst hyd	5 20	(75)%	80%

Two samples made in November 1930, and stabilized with hypophosphorous acid were reassayed, with the following results

No 1—Assay Nov 1930, 125%, May 1931, 125%, Nov 1932, 120%

No 2—Assay Nov 1930, 125%, May 1931, 125%, Nov 1932, 120%

One cannot draw positive and final conclusions from so few experiments when all are not in harmony, but the above results indicate with reasonable agreement the following

Stronger alcoholic menstrua exert a stabilizing influence, but add greatly to the difficulty of extraction. Ergot is a difficult drug to extract, and yields to aqueous menstrua more readily than to alcoholic. This may explain the continued favor of aqueous preparations of ergot. When fresh they may represent the drug in fuller measure than alcoholic extracts.

We may also note that Moir of England claims that ergot has an action upon the uterus which is not due to its alkaloids but is caused by an undiscovered water-soluble substance. While his claims have not yet been confirmed he is too prominent to be ignored, and it may not be wise to shut the official door upon low-alcoholic preparations.

We also have to consider that while ergot contains alkaloids which are not themselves soluble in water, they probably are soluble in an aqueous extract of the drug, particularly when acidulated.

In view of the greater efficiency in extraction, and its probable inclusion of all the active principles, it seems wise to adhere to the present alcoholic strength of menstruum (for this revision).

An acidity equivalent to a p<sub>H</sub> of about 3 is generally accepted as adding to stability by most of the workers on this preparation. The above results also confirm the opinion that an acid which has a reducing action is better than one which does not. Thus tartaric and hypophosphorous acids show a greater stabilizing action than does hydrochloric acid. The (new) British Pharmacopœia uses tartaric acid—in rather indefinite amount—in its Liquid Extract of Ergot.

In the above experiments—and those made two years ago—hypophosphorous acid seems to be the more effective stabilizer. Since this is a strong reducing agent its influence is but logical.

It is well to bear in mind that the methods of standardizing ergot are the least satisfactory of any in use. A variation of 20% is not considered unreasonable by the official method.

The assays on the preparations herein reported were all made by one of us (L W R), who has had considerable experience with the official Cock's Comb method as well as with the Broom and Clark method. Some prefer the Broom and Clark method, in which the inhibiting action of ergot is observed on a strip of rabbit-uterus muscle—but a considerable margin of error is acknowledged for it.

The British Pharmacopœia has adopted the colorimetric determination of alkaloids by chemical methods, on the ground that while this includes both the inactive and active alkaloids the error "is probably less" than is found in biological methods.

These facts are mentioned simply to make plain that the activity figures in the above table cannot be taken with the same confidence as in the chemical assays of other alkaloidal drugs. Some of these assays were repeated because the second assay showed a materially higher activity than the first—which is, of course, contradictory. In such cases the lower figure of the (repeated) assays is given. In all tests at least two roosters were used and in several cases three, for each test.

The best prospect seems to be to use diluted alcohol with hypophosphorous acid for this preparation. In the sample prepared two years ago an equivalent of 40 cc of U S P Hypophosphorous Acid (30%) per liter was needed to produce a  $p_H$  of 4.15. In the one made a year ago—and reported in the above table an equivalent of 26 cc per liter was required.

With tartaric acid, the sample in the table contains 30 Gm per liter.

Better results in extraction may be expected when the acid is used in the menstruum rather than added to the fluidextract. The amount of acid to be directed will vary with the alcoholic strength of the menstruum—less being needed for high strength alcohol than for low.

RESEARCH LABORATORIES OF PARKE, DAVIS & Co.,  
DETROIT, MICH

---

## THE STANDARDIZATION OF ERGOT \*<sup>1</sup>

BY ASA N STEVENS

A COMPARATIVE STUDY OF THE BRITISH PHARMACOPŒIA ASSAY FOR EXTRACTUM ERGOTÆ LIQUIDUM AND THE MODIFICATION OF SMITH'S QUANTITATIVE COLORIMETRIC ASSAY

A colorimetric method of assay for Ergot and its preparations is given official recognition in the recently revised "British Pharmacopœia 1932." The close relationship that exists between the British Pharmacopœia assay for Liquid Extract of Ergot and the Modification of Smith's Quantitative Colorimetric (1) Assay, which was outlined by the writer in an earlier paper, has made it desirable to undertake a comparative study of the two methods as they apply to the assay of Fluid extract of Ergot U S P.

It is the purpose of this paper, therefore, to present and to compare the results that have been obtained by the use of both methods.

---

\* Scientific Section A Ph A, Madison meeting 1933

<sup>1</sup> From the Analytical Laboratories, Eli Lilly & Co

The assay procedure now given in the British Pharmacopœia for Liquid Extract of Ergot is quoted as follows

"Assay Introduce 10 mls into a separator, add 50 mls of water, render slightly alkaline with dilute solution of ammonia, and extract with four successive portions of 40, 25, 20 and 15 mls of anæsthetic ether. Wash the mixed ethereal solutions with three successive portions of 25 mls of water mixed with 0.2 mls of dilute solution of ammonia, then wash once with 25 mls of water. Shake with four successive 10 ml portions of a 1% w/v solution of tartaric acid in water, separate, and mix the aqueous liquids, transfer to a porcelain dish, remove the dissolved ether by gentle warming in a current of air and add sufficient water to produce 40 mls or other suitable volume. Mix 1 ml with 2 mls of solution of dimethylaminobenzaldehyde and place in warm water until the temperature reaches 45 degrees. Remove from the water bath and expose to bright light for a period varying from 10 minutes to two hours, according to the intensity of the light, until the blue-violet colour which is produced reaches its maximum. In the same manner mix 1 ml of solution of ergotoxine ethanesulphonate (0.012% w/v in 1% tartaric acid) with 2 mls of solution of dimethylaminobenzaldehyde, heat to 45 degrees and expose to the same source of light for the same length of time. Determine the ratio of the colour intensities by comparing them in a suitable colorimeter. The colour produced by 1 ml of the solution of ergotoxine ethanesulphonate is equivalent to that produced by 0.0001 Gm of total alkaloids under identical conditions. The acid solution of the alkaloids should be suitably diluted so that the colour, produced during the test, does not differ by more than 20% from that produced in the solution of ergotoxine ethanesulphonate."

The details of the Modification of Smith's Quantitative Colorimetric Assay are given in the February 1933 issue of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION on page 102 and are not repeated at this time.

Table I shows the results obtained by the use of both methods on the same samples of Fluidextract of Ergot.

Sample No	TABLE I	B. P. Method % Activity
	Modified Method % Activity	
1	114.0	130.0
2	100.0	100.0
3	115.0	108.0
4	90.0	93.0
5	115.0	95.0
6	103.0	103.0
7	57.0	53.0
8	80.0	73.0
9	95.0	94.0
10	115.0	115.0
Average	98.4	96.4

It will be noted that in nearly every case there is a close agreement in the results that have been obtained, notwithstanding the fact that each method differs with regard to the amount of the alkaloidal salt that is used as the basis for color comparison. In the British Pharmacopœia method 0.00012 Gm of ergotoxine ethanesulphonate is given as the standard while in the Modification of Smith's Quantitative Colorimetric Assay 0.0001 Gm of ergotamine tartrate is used.

With this thought in mind, a series of tests were made in order to study the behavior of the foregoing quantities of ergotoxine ethanesulphonate and of ergotamine tartrate when used, separately, as standards in only one of the two methods. For this purpose the British Pharmacopœia method was selected and the procedure changed in order to permit the use of a Watkins' (2) extractor, instead of a sepa-

The assays on the preparations herein reported were all made by one of us (L W R), who has had considerable experience with the official Cock's Comb method as well as with the Broom and Clark method. Some prefer the Broom and Clark method, in which the inhibiting action of ergot is observed on a strip of rabbit-uterus muscle—but a considerable margin of error is acknowledged for it.

The British Pharmacopœia has adopted the colorimetric determination of alkaloids by chemical methods, on the ground that while this includes both the inactive and active alkaloids the error "is probably less" than is found in biological methods.

These facts are mentioned simply to make plain that the activity figures in the above table cannot be taken with the same confidence as in the chemical assays of other alkaloidal drugs. Some of these assays were repeated because the second assay showed a materially higher activity than the first—which is, of course, contradictory. In such cases the lower figure of the (repeated) assays is given. In all tests at least two roosters were used and in several cases three, for each test.

The best prospect seems to be to use diluted alcohol with hypophosphorous acid for this preparation. In the sample prepared two years ago an equivalent of 40 cc of U S P Hypophosphorous Acid (30%) per liter was needed to produce a  $p_H$  of 4.15. In the one made a year ago—and reported in the above table an equivalent of 26 cc per liter was required.

With tartaric acid, the sample in the table contains 30 Gm per liter.

Better results in extraction may be expected when the acid is used in the menstruum rather than added to the fluidextract. The amount of acid to be directed will vary with the alcoholic strength of the menstruum—less being needed for high strength alcohol than for low.

RESEARCH LABORATORIES OF PARKE, DAVIS & CO.,  
DETROIT, MICH

---

## THE STANDARDIZATION OF ERGOT \*<sup>1</sup>

BY ASA N STEVENS

A COMPARATIVE STUDY OF THE BRITISH PHARMACOPŒIA ASSAY FOR EXTRACTUM ERGOTÆ LIQUIDUM AND THE MODIFICATION OF SMITH'S QUANTITATIVE COLORIMETRIC ASSAY

A colorimetric method of assay for Ergot and its preparations is given official recognition in the recently revised "British Pharmacopœia 1932". The close relationship that exists between the British Pharmacopœia assay for Liquid Extract of Ergot and the Modification of Smith's Quantitative Colorimetric (1) Assay, which was outlined by the writer in an earlier paper, has made it desirable to undertake a comparative study of the two methods as they apply to the assay of Fluid extract of Ergot U S P.

It is the purpose of this paper, therefore, to present and to compare the results that have been obtained by the use of both methods.

---

\* Scientific Section A PH A, Madison meeting 1933

<sup>1</sup> From the Analytical Laboratories, Eli Lilly & Co



The assay procedure now given in the British Pharmacopœia for Liquid Extract of Ergot is quoted as follows

' Assay Introduce 10 mls into a separator, add 50 mls of water, render slightly alkaline with dilute solution of ammonia, and extract with four successive portions of 40, 25, 20 and 15 mls of anæsthetic ether. Wash the mixed ethereal solutions with three successive portions of 25 mls of water mixed with 0.2 mls of dilute solution of ammonia, then wash once with 25 mls of water. Shake with four successive 10 ml portions of a 1% w/v solution of tartaric acid in water. Separate and mix the aqueous liquids, transfer to a porcelain dish, remove the dissolved ether by gentle warming in a current of air and add sufficient water to produce 40 mls or other suitable volume. Mix 1 ml with 2 mls of solution of dimethylaminobenzaldehyde and place in warm water until the temperature reaches 45 degrees. Remove from the water bath and expose to bright light for a period varying from 10 minutes to two hours, according to the intensity of the light, until the blue violet colour which is produced reaches its maximum. In the same manner mix 1 ml of solution of ergotoxine ethanesulphonate (0.012% w/v in 1% tartaric acid) with 2 mls of solution of dimethylaminobenzaldehyde, heat to 45 degrees and expose to the same source of light for the same length of time. Determine the ratio of the colour intensities by comparing them in a suitable colorimeter. The colour produced by 1 ml of the solution of ergotoxine ethanesulphonate is equivalent to that produced by 0.0001 Gm of total alkaloids under identical conditions. The acid solution of the alkaloids should be suitably diluted so that the colour produced during the test, does not differ by more than 20% from that produced in the solution of ergotoxine ethanesulphonate "

The details of the Modification of Smith's Quantitative Colorimetric Assay are given in the February 1933 issue of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION on page 102 and are not repeated at this time

Table I shows the results obtained by the use of both methods on the same samples of Fluidextract of Ergot

Sample No	TABLE I	
	Modified Method % Activity	B. P. Method % Activity
1	114.0	130.0
2	100.0	100.0
3	115.0	108.0
4	90.0	93.0
5	115.0	95.0
6	103.0	103.0
7	57.0	53.0
8	80.0	73.0
9	95.0	94.0
10	115.0	115.0
Average	98.4	96.4

It will be noted that in nearly every case there is a close agreement in the results that have been obtained, notwithstanding the fact that each method differs with regard to the amount of the alkaloidal salt that is used as the basis for color comparison. In the British Pharmacopœia method 0.00012 Gm of ergotoxine ethanesulphonate is given as the standard while in the Modification of Smith's Quantitative Colorimetric Assay 0.0001 Gm of ergotamine tartrate is used.

With this thought in mind, a series of tests were made in order to study the behavior of the foregoing quantities of ergotoxine ethanesulphonate and of ergotamine tartrate when used, separately, as standards in only one of the two methods. For this purpose the British Pharmacopœia method was selected and the procedure changed in order to permit the use of a Watkins' (2) extractor, instead of a sepa-

rator, for making the first ether extraction, thereby avoiding the tendency to form emulsions. Also, the acid solution of dimethylaminobenzaldehyde and alkaloid was not heated. The results obtained on a series of samples of Fluidextract of Ergot U S P are given in Table II.

TABLE II

Sample No	Ergotoxine Ethanesulphonate % Activity	Ergotamine Tartrate % Activity
1	92.0	106.0
2	80.0	100.0
3	49.8	52.5
4	89.5	106.0
5	100.0	102.0
6	64.0	72.0
7	95.0	104.0
8	80.0	83.0
9	52.0	64.0
Average	78.0	87.7

## DISCUSSION

It will be noted in Table I that slightly lower results are generally obtained by the British Pharmacopœia method. The British Pharmacopœia standard also gives consistently lower figures when compared with the Modification of Smith's Quantitative Colorimetric Assay's standard as is indicated by Table II. This is probably due to the fact that the British Pharmacopœia method calls for a correspondingly larger amount of an alkaloidal salt of ergot as the basis for color comparison. When the prescribed quantities of the two standards were subjected to colorimetric comparison in 1 cc. of 1% tartaric acid solution, 0.0001 Gm. of ergotamine tartrate was found to have a color value equal to about 80% of that shown by 0.00012 Gm. of ergotoxine ethanesulphonate. On the other hand, when exactly the same concentrations of the two salts were compared on the same basis the readings obtained were identical.

The use of 50% sulphuric acid, which is prescribed by the British Pharmacopœia as the solvent for dimethylaminobenzaldehyde, offers a distinct advantage over the concentrated acid that is used in the Modification of Smith's Quantitative Colorimetric Assay in that very little heat is developed when the solution is added to the solution containing the ergot alkaloid. This does away with the necessity of chilling the mixture which is always required in the Modification of Smith's Colorimetric Assay procedure.

A better blue color is obtained if the solution of dimethylaminobenzaldehyde and alkaloid is not heated.

## CONCLUSIONS

1. A comparative study has been made between the British Pharmacopœia assay method for Liquid Extract of Ergot and the Modification of Smith's Quantitative Colorimetric Assay as they are applied to the assay of Fluidextract of Ergot U S P.

2. A difference in the amount of alkaloidal salt used as the basis for colorimetric comparison has been pointed out.

3 The use of 50% sulphuric acid as the solvent for dimethylaminobenzaldehyde and of a Watkins' extractor in making the first ether extraction have been cited as advantages

4 A better blue color is obtained if the solution of dimethylaminobenzaldehyde and alkaloid is not heated

The author wishes to express his appreciation to Mr E J Hughes for his friendly criticism

#### BIBLIOGRAPHY

- (1) A N Stevens, "The Standardization of Ergot—A Modification of Smith's Quantitative Colorimetric Assay," *JOUR A PH A*, Vol 22, 2 (1933), 99
- (2) S Palkin, A G Murray and H K Watkins, "Automatic Devices for Extracting Alkaloidal Solutions," *Ind Eng Chem* 17 (1925), 612

### LACTUCARIA I THE MYDRIATIC ACTIVITY OF LACTUCARIA BY THE MUNCH METHOD \*1

BY JAMES C MUNCH, HARRY J PRATT AND GEORGE E BYERS

Lactucarium is the "dried milk-juice of *lactuca virosa* Linne (Fam *Compositæ*)" (34) It was official from the First U S P in 1820 to the Ninth of 1916, but was dropped from the recognized drugs in U S P X (24) It has been used in homeopathic medicine in which it is described as the concrete juice of *L virosa*, *L sativa*, *L scariola* and *L alhissima* (1, 20)

If lactucarium were capable of producing the effects attributed to it, it would be very miraculous Descriptions in Folklore and in early scientific papers affirmed that it was a sedative, resembled opium in its effect, could be used as a substitute for opium, and later still that it contained hyoscyamine or some of the other mydriatic alkaloids (2, 3, 4, 8, 9, 10, 11, 12, 18, 22, 23, 25, 28, 29, 30, 31, 32, 35, 36, 37)

Apparently, the introduction of lactucarium as the dried juice of *L virosa* was due to some inconclusive experiments by John Redman Coxe, presented at the meeting of the American Philosophical Society in 1797, at Philadelphia Comparing the effects with those of opium, he decided that the two were similar in action, and called the material "lettuce opium" A careful scrutiny of his report fails to show any basis for this startling deduction (8, 9) Work by Duncan, Sr, in Edinburgh at about the same time appears to be responsible for the introduction of this product into the Dublin and Edinburgh Pharmacopœias (11)

To prepare lactucarium, various species of *lactuca* appear to have been used (*virosa*, *scariola*, *sativa*, *canadensis*, *septiva* and *alhissima*, being most frequently reported (1, 2, 6, 7, 8, 12, 14, 16, 19, 20, 21))

The juice is collected by cutting off the top of the lettuce plant in June, when it is just ready to blossom The latex is collected daily As needed, new incisions are made in the stalk The combined latex is dried, forming irregular brown lumps of a narcotic odor and bitter taste (6, 24, 37)

\* Scientific Section, A PH A Madison meeting, 1933

<sup>1</sup> Joint communication from the Department of Research, School of Pharmacy, Temple University, and Department of Pharmacology, Sharp and Dohme, Philadelphia, Pa

A number of active principles have been reported, most of them proving to be impure mixtures on further study. No agreement has been found regarding one specific principle to which the activity may be ascribed. Various extractives have been called lactucin, lactopicrin, lactucic acid, lactucerin, lactucone, lactucero. In addition, oxalic acid, mannite and other materials have been observed (2, 3, 6, 7, 13, 14, 15, 16, 18, 22, 25, 28, 31, 35, 37, 38).

Adulteration of lactucarium has been reported with bread crumbs (22), gum opium and other materials of similar appearance.

The popular belief has been encountered in various parts of the world that the consumption of lettuce produces a sedative or soporific effect. It is impossible to determine exactly what products were used, but it would appear that many of the earlier reports alleging narcotic activity were conducted on material which was not chemically or pharmacognostically identified. Hirschfeld (19) in 1833 reported observations on sparrows, other birds and rabbits, as well as a few tests on man, concluding that the principal narcotic substance was volatile and recommended the use of lactucarium for various convulsions, coughs and spasms. Many of the older encyclopedias and books refer to the hypnotic or sleep-producing effect and this has been occasionally reprinted without confirmation in recent texts (1, 3, 11, 29, 30, 31, 32, 36, 37).

Cushny states that  $\frac{1}{2}$  ounce failed to cause any effects on a dog. Wood and Bache were unable to produce any results with doses of 10 to 20 grains or more. Sollmann states that the reputation of lettuce as a hypnotic is probably undeserved as Kelterborn took 12 Gm. of lactucarium without any effect (10, 30, 37).

A commercial mixture has been found containing 0.5 mg. of morphine sulphate with 60 mg. of lactucarium and other constituents. This type of product may be the type which has been reported to be effective (33).

So far as the mydriatic activity is concerned, the earliest reference found was Ludwig, who suggests that "Gifflattick" should be capable of constricting the pupil. This served as the basis of an investigation by Gerber in 1863. Applied externally or internally lactucarium did not influence the diameter of pupils of rabbits (17).

Dymond (13) made a chemical examination of an extract of *L. virosa* and obtained a very small amount of a substance which he identified by chemical properties as hyoscyamine. Braithwaite and Stevenson (5) collected some French flowering *L. virosa* in Essex, England, which was crushed, extracted with dilute hydrochloric acid, then the aqueous solution shaken out with ether, made alkaline with ammonia and extracted with ether again. The residue was dissolved in a trace of hydrochloric acid and failed to cause mydriasis in four humans on whom it was tested. Four hundred grams of fresh plant were taken and an extract obtained in about 1 cc.

This work was repeated by Farr and Wright, using 1 kilo of fresh herb obtained from Braithwaite, the herb was dried and extracted with alcohol and acid, the filtrate concentrated, made alkaline with ammonia and extracted with chloroform. About 0.6 mg. of material was obtained, which gave alkaloidal reactions with Mayer's and Thresh's reagents. Applied to the pupils of two humans, powerful mydriatic effects were obtained. In a discussion of this paper (15) Ransom stated that he had obtained 0.015 per cent of a chloroform extract from lactucarium, which was mydriatic. It appeared strange, however, that ether extraction by Braith

waite and Stevenson had not obtained any mydriatic alkaloid. Wright subsequently (38) repeated this procedure on *lactuca muralis*, finding negative results in a general examination and only minute quantities of alkaloid in a more intensive study. These ranged from 0.06 per thousand in the leaves to 0.15 per thousand in the root.

In order to obtain more definite information regarding the presence of active alkaloids in lactucarium, a series of investigations were initiated. This report deals with the studies made to determine the mydriatic activities of lactucaria.

#### EXPERIMENTAL PROCEDURE

A number of adult cats were confined in individual cages. They were handled daily in order to develop their friendship and to facilitate ease in use. The thresholds of each cat were determined for known solutions of atropine, hyoscyamine, hyoscine and in most instances for physostigmine. The technique previously developed by Munch (26), (27) was used. Exactly 0.05 cc. of solution was placed on the cornea of a cat, the inner canthus compressed and the lids opened and closed over a period of thirty to sixty seconds, until absorption was apparently complete. Just before this application, and at half-hour intervals over a period of three hours, the pupils were inspected to note any differences in diameter which might develop between treated and untreated eyes. Each cat was placed one foot from a bright light and the degree of pupillary contraction determined. By means of a transparent celluloid scale the pupillary diameters were easily measured. A satisfactory degree of effect was attained when the treated pupil differed by 0.5 mm. from the untreated pupil.

In preparing lactucarium two procedures were used. In one, the method outlined in the Pharmacopœia was followed (grinding with sand, etc.). Similar tests were conducted on the same samples by acidifying and boiling lactucarium with alcohol, under the belief that the mydriatic alkaloids, if any, would dissolve in this solvent. Four samples of lactucarium were studied.

In addition, three different samples of lettuce were purchased on the open market, dried in an incubator at about 37° C., ground and percolated to make a fluidextract. Approximately 70 per cent alcohol was used as the menstruum.

In a few experiments the alcoholic solutions were used as such, although in general the alcohol was removed and the volume made up with distilled water to the original quantity.

Tests were conducted on four samples of lactucarium and three samples of lettuce. No extracts ever showed any mydriatic potency.

#### CONCLUSION

1. No evidence of mydriatic action was found in testing four samples of lactucarium and three samples of lettuce.

#### BIBLIOGRAPHY

- (1) Timothy F. Allen, "Lactuca." The Encyclopedia of Pure Materia Medica, 5 (1877), 487-500.
- (2) Aubergier, French Lactucarium. Proc. A. Ph. A., 25 (1877), 155.

- (3) W A Bastedo, "Materia Medica Pharmacology, Therapeutics and Prescription Writing" (1915), 369
- (4) Beck, "Medical Jurisprudence" (1870), 817
- (5) J C Braithwaite and H E Stevenson, "The Non-Existence of Mydriatic Alkaloid in *Lactuca virosa*," *P J*, 71 (1903), 148
- (6) W Brandt and R Wasicky, "Lactucarium" In "Thoms Handbuch der Pharmazie" 5 (1930), 1697-1698
- (7) A H Church, "*Lactuca sativa* analysis," *Arch Pharm* (January 1877), through *Proc A Ph A*, 25 (1877), 155
- (8) J R Cole 'An Inquiry into the Comparative Effects of the Opium Officinarum Extracted from the *Papaver somniferum* or White Poppy of Linnæus, and of That Procured from the *Lactuca sativa* or Common Cultivated Lettuce of the Same Author," *Trans Amer Philosoph Soc*, 4 (1799) 387-414
- (9) J R Cole, "The American Dispensatory" (1806)
- (10) A R Cushny 'Pharmacology and Therapeutics" (1906), 4th Edition 234
- (11) Duncan "Observations on the Distinguishing Symptoms, Etc, of Pulmonary Consumption" (1816), 2nd Edition 174
- (12) R Dughlson, "*Lactuca virosa*" General Therap Mat Med, 1 (1843), 381
- (13) T S Dymond, "The Existence of Hyoscyamine in Lettuce," *J C S* 61 (1892) 90-94
- (14) Thomas Fairgrieve, "Cultivation of Lactucarium," *P J* (June 7, 1873), through *Proc A Ph A*, 22 (1874), 118
- (15) E H Farr and R Wright "The Disputed Presence of a Mydriatic Alkaloid in *Lactuca virosa*," *P J*, 72 (1904), 186
- (16) Hiland Flowers, "Lactucarium from *Lactuca canadensis*" *Am J Pharm* (1879), 343-346, through *Proc A Ph A*, 28 (1880), 145
- (17) Theo Augustus Gerber Quo Modo Lactucarium Musculos Iridis Afficiat," *Dissertatio Inauguralis Universitate Frederica Guilelma* (1863)
- (18) O Hess, Handwörterbuch, 4 (1887), 8
- (19) Henricus Hirschfeld 'De Lactuca Virosa et Scariola," *Dissertatio Inauguralis Universitate Frederica Guilelma* (1833)
- (20) "American Homeopathic Pharmacopœia" (1906), 8th Edition 286
- (21) G Kiefer, "Collection of Lactucarium in the Valley of Mosel" *Pharm Ztg*, 50 (1904), 143, through *Proc A Ph A*, 53 (1905), 636
- (22) Kremel, "Examination of Lactucarium" *Pharm Zentralhalle* (1888), 512 through *Proc A Ph A*, 37 (1889) 450
- (23) C F Leyel, "The Magic of Herbs," A Modern Book of Secrets (1926)
- (24) J U Lloyd, 'Pharmacopœial Vegetable Drugs, Chemicals and Preparations' (1921) 179
- (25) Ludwig, 'Composition of Lactucarium," through 19th Edition, U S Dispensatory (1877) 688
- (26) James C Munch, "Cat-Eye Method for the Assay of Mydriatics and Miotics," *J A O A C*, 10 (1927), 383-386 11 (1928), 53, 362-366
- (27) James C Munch, 'Bioassay—A Handbook of Quantitative Pharmacology" (1931)
- (28) B E Nelson "The Analysis of Drugs and Medicine" (1910) 282
- (29) H H Rusby, A R Bliss and C W Ballard, "The Properties and Uses of Drugs" (1930), 425
- (30) T Sollmann, "A Manual of Pharmacology" (1932), 4th Edition, 330
- (31) A Stille, "Therapeutics and Materia Medica," 1 (1868), 755-758
- (32) H Tappener "Lehrbuch der Arzneimittellehre und Arzneiverordnungslehre" (1890), 220
- (33) H Thoms "Handbuch der Pharmazie" 6 (1930) 1276
- (34) U S Pharmacopœia 9th Edition (1916)
- (35) Walz, "Active Principle of Lactucarium" through 19th Edition U S Dispensatory (1877), 688
- (36) H C Wood, "Pharmacology and Therapeutics" (1912), 408

(37) G B Wood and F Bache, U S Dispensary, 19th Edition (1907), 687

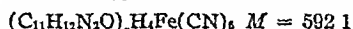
(38) R Wright, "Occurrence and Distribution of Mydriatic Alkaloids in *Lactuca muralis*,"  
P J (1905), 548, through Proc A Ph A, 53 (1905), 636

## THE GRAVIMETRIC AND VOLUMETRIC DETERMINATION OF ANTI- PYRINE AS HYDROFERROCYNANIDE IN THE PRESENCE OF AMIDOPYRINE \*<sup>1</sup>

BY I M KOLTHOFF

The simple iodometric determination<sup>2</sup> of antipyrine cannot be applied in the presence of amidopyrine, since the latter substance is oxidized by iodine. In the present work it has been found that antipyrine yields a crystalline precipitate with potassium ferrocyanide in acid medium whereas amidopyrine does not react under similar conditions. Use of this precipitation reaction has been made in the quantitative determination of antipyrine, the method can be applied in the presence of amidopyrine.

*Composition of the Hydroferrocyanide of Antipyrine*—The crystalline precipitate formed in an acid medium of hydrochloric acid and containing an excess of potassium ferrocyanide was collected, washed with water, alcohol and ether, and air dried. On heating in vacuum at 70° no loss in weight was noticed. It should be mentioned that the air-dry precipitate obtained after washing with alcohol (no ether) contains 0.3 to 0.4% of water. The hydroferrocyanide content of the precipitate was determined by titrating 0.1000-Gm samples with sodium hydroxide using phenolphthalein as an indicator. The hydroferrocyanic acid behaves as a quadrivalent acid, the antipyrine, being a very weak base, does not affect the titration. It was found that 0.1 Gm required 12.78, 12.75, 12.72 cc, 0.0529N sodium hydroxide, respectively, corresponding to a molecular weight of the precipitate of 592.1. From the above it may be concluded that the crystals consist of a compound of 2 molecules antipyrine and 1 molecule hydroferrocyanic acid



The composition is different from that of the hydroferrocyanides of most alkaloids which ordinarily yield precipitates containing water of crystallization and one molecule of alkaloid per one molecule of hydroferrocyanic acid.

*Sensitivity of the Precipitation of Antipyrine*—The sensitivity depends upon the concentration of ferrocyanide and the acidity of the mixture. In the following experiments the solution was acidified with hydrochloric acid. It appeared advantageous to have a large excess of potassium ferrocyanide. After some systematic experiments, the following procedure was adopted. 2 cc 0.5 molar potassium ferrocyanide were added to 5 cc antipyrine solution, the latter containing the concentration of hydrochloric acid as given in Table I.

The optimum acidity is 0.5 to 0.75N of hydrochloric acid. 2 mg antipyrine can be detected if 2 cc 0.5-molar potassium ferrocyanide and 0.5 cc 6N hydro-

\* Scientific Section, A Ph A, Madison meeting, 1933

<sup>1</sup> Contribution from the School of Chemistry of the University of Minnesota

<sup>2</sup> Comp I M Kolthoff, "Volumetric Analysis," Vol 2, page 454, translated by N H Furman, John Wiley & Sons New York, 1929

chloric acid are added to 5 cc of the solution. If no precipitate appears after ten minutes of standing, less than 2 mg of antipyrine are present.

TABLE I—SENSITIVITY OF PRECIPITATION OF ANTIPYRINE

Antipyrine Present in 5 cc Solution Mg	Concentration HCl in Mixture N	Result.
2.5	0.1	No precipitate after 3 hours
2.5	0.5	Precipitate after 5-6 min
2.5	1.0	Precipitate after 15 min
2.5	3.0	No precipitate after 3 hours
1.25	0.5	No precipitate after 2 hours

*Solubility of Antipyrine Hydroferrocyanide*—In connection with the quantitative determinations it was of interest to know the losses in weight of the precipitate on washing with various solutions. Fifty cc of the solvent were drawn through glass-filtering crucibles containing known weights of the precipitate at the rate of 10 cc per minute. The crucibles were then dried at 110° and reweighed. The losses in weight are given in Table II.

The solubility in the various solvents with the exception of ether is appreciable and cannot be neglected in quantitative determinations.

TABLE II—LOSS IN WEIGHT ON WASHING OF ANTIPYRINE HYDROFERROCYNANIDE

Solvent	Precipitate Dissolved in 50-cc Solvent Mg
Water	71.8
95% Alcohol	38.3
Ether	0.0
0.1N HCl	22.7
1N HCl	31.0
3N HCl	107.5
0.1N $K_4Fe(CN)_6$	133*
0.5N $K_4Fe(CN)_6$	343*

\* Determined by titrating the filtrate with standard sodium hydroxide.

*Gravimetric Determination of Antipyrine*—Preliminary experiments carried out under various conditions yielded low results owing to the solubility of the antipyrine hydroferrocyanide in the precipitation mixture and the wash liquids. Therefore it was decided to use a saturated solution of antipyrine hydroferrocyanide in water as a wash liquid. The latter has to be freshly prepared every day by shaking some of the precipitate with water. After a day of standing, it turns bluish owing to decomposition of the hydroferrocyanic acid.

*Procedure*—A weighed amount of the sample containing about 0.2 to 0.3 Gm antipyrine is dissolved in about 30 cc 0.8N hydrochloric acid. 20 cc 0.5 molar potassium ferrocyanide are added slowly with stirring of the mixture. The precipitate is allowed to stand for thirty minutes and is then filtered on a Gooch crucible with paper disc or a glass-sintered crucible. The residual precipitate in the flask is transferred to the crucible by use of the filtrate, and when the transfer is complete it is finally washed four times with 2-3-cc portions of the freshly prepared saturated solution of the precipitate in water. The crucible is then dried for thirty minutes at 105-110° and weighed after cooling. A correction for the loss by solubility is made by adding 5 mg to the weight of the precipitate found. The latter contains 63.53% antipyrine.



*Volumetric Determination of the Precipitate*—The gravimetric procedure is followed. It is recommended to use in this case the Gooch crucible with paper disc instead of the sintered glass crucible. After washing, the precipitate and filter paper are dislodged with the point of a spatula and transferred to an Erlenmeyer flask, any precipitate remaining in the crucible being carried over in the flask with distilled water in equilibrium with the atmosphere. A few drops of phenolphthalein are added to the mixture and standard (0.05 to 0.1N) sodium hydroxide run in with constant stirring. The precipitates dissolve rather slowly but finally disappear completely. The end-point is reached when the pink color is stable for 2 to 3 minutes. A titration is made with the same volume of water as used in the suspension of the precipitate and this blank subtracted from the volume of standard reagent required in the titration. This blank should not exceed 0.05 cc 0.1N sodium hydroxide for 50 cc. A correction for the loss by solubility is made by adding 0.34 cc 0.1N NaOH to the required volume of reagent.

TABLE III

Antipyrine Taken Gm	Antipyrine Found (Corrected for Solubility)		Error %	Vol
	Grav	Vol		
0.2896	0.2908	0.2908	+0.4	+0.4
0.2896	0.2916	0.2910	+0.7	+0.5
0.2896 <sup>b</sup>	0.2912	0.2907	+0.55	+0.44
0.2896 <sup>a</sup>	0.2905	0.2898	+0.3	0.0
0.2896 <sup>a</sup>	0.2926	0.2922	+1.0	+0.9
0.1159	0.1164	0.1154	+0.4	-0.4
0.1159	0.1168	0.1174	+0.8	+1.3
0.1159 <sup>b</sup>	0.1168	0.1174	+0.8	+1.3
0.1159 <sup>a</sup>	0.1129	0.1121	-2.6	-3.3
0.1159 <sup>a,b</sup>	0.1136	0.1130	-2.0	-2.5
0.1159 <sup>a,b</sup>	0.1136	0.1130	-2.0	-2.5

<sup>a</sup> 0.6 Gm. amidopyrine was added

<sup>b</sup> 1 hour of standing before filtration

One cc 0.1N NaOH corresponds to 9.4 mg antipyrine. Some results are given in Table III. It may be inferred that the method gives results accurate within 1% for quantities of antipyrine between 0.1 to 0.3 Gm. 0.6 Gm. of pyramdone with 0.3 Gm. antipyrine does not affect the results, the same amount of pyramdone with 0.1 Gm. antipyrine lowers the results about 2 to 3%. It is not recommended that the method be used for the determination of quantities of antipyrine much smaller than 100 mg.

Finally the author wishes to express his sincere appreciation to J. J. Lingane for his faithful help in carrying out the experiments.

## SUMMARY

1. In acid medium antipyrine gives a crystalline precipitate with ferrocyanide having the composition  $(C_{11}H_{12}N_2O)_2H_4Fe(CN)_6$ .
2. A gravimetric and volumetric procedure has been described for the quanti-

tative estimation of antipyrine in the form of its hydroferrocyanide The method can be applied in the presence of amidopyrine

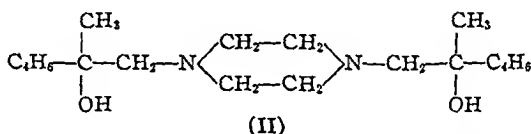
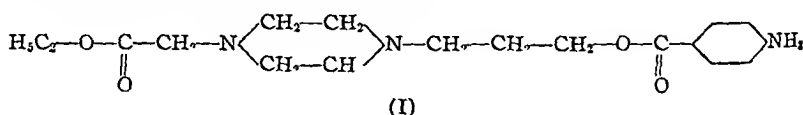
MINNEAPOLIS, MINN

May 1933

## PIPERAZINE DERIVATIVES AS LOCAL ANESTHETICS \*

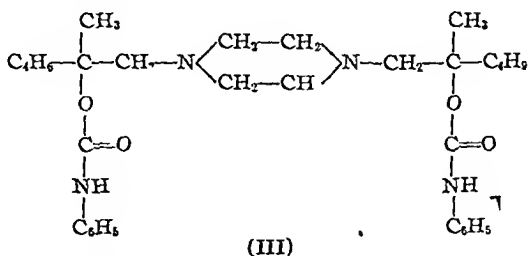
BY W BRAKER AND W G CHRISTIANSEN

Several piperazine derivatives have been reported in the literature (1) to possess anesthetic activity This investigation concerns the *p*-amino benzoate of 4-(carbethoxymethyl)-1-piperazine propanol (I) and the phenyl urethane of 1,4-bis( $\beta$ -hydroxy- $\beta$ -methyl hexyl) piperazine (II)



It is stated (2) that 1,4-bis( $\beta$ -hydroxy- $\beta$ -methyl hexyl)piperazine has a definite anesthetic action on the rabbit's tongue An increase in the size of the alkyl groups was accompanied by increased activity so that the heptyl derivatives were considerably more effective than cocaine

The method of preparation of 1,4-bis( $\beta$ -hydroxy- $\beta$ -methyl hexyl)piperazine is contained below An effort to prepare a mono-phenyl urethane of this substance resulted in the isolation of only the diphenyl urethane derivative (III) No further attempt was made to prepare the mono-phenyl urethane

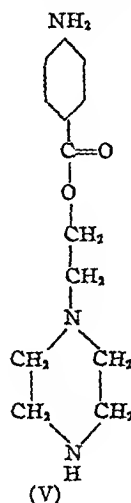
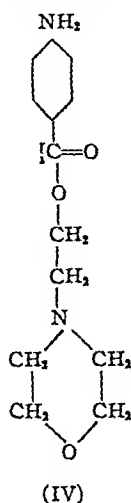


The dihydrochloride of (III) was found to be soluble to the extent of only 1.1% The  $p_H$  of such a solution was found to be 2.2 and the solution would not permit of buffering Consequently, it appeared impractical to further study such types of compounds

The *p*-amino benzoate of 4-( $\beta$ -hydroxyethyl)morpholine (IV) has been reported to be an active anesthetic (3) A study of the substitution of the oxygen atom in

\* Scientific Section, A. P. H. A., Madison meeting, 1933

the morpholine ring by a nitrogen atom was therefore commenced. The relationship between these compounds is demonstrated by their structural formulas



It is difficult to prepare the compound (V) with substitution on only one of the extremely basic nitrogens. As a result it was necessary to first obtain a mono-substituted piperazine. This was accomplished by preparing ethyl 1-piperazineacetate and subsequently therefrom the compound I. The synthesis is described below.

A 2% aqueous solution of the dihydrochloride of I could be effectively buffered with sodium phosphate to a  $p_H$  of 6.8. This solution was tested for anesthetic activity but it was comparatively inactive judging from the results of intradermal injections in guinea pigs.

#### EXPERIMENTAL

*Ethyl 1-Piperazineacetate*—The procedure followed consisted of reacting piperazine with ethyl chloracetate and subsequently fractionating the substance from 1,4-bis(carbethoxymethyl)piperazine.

Boiling point of ethyl 1-piperazineacetate—153–159° C at 9–11 mm

Yield—7.0 Gm. of a colorless oil

Assay N, Found 15.75%

Calculated for  $C_8H_{16}O_2N_2$  16.28%

*Ethyl-4-( $\gamma$ -Hydroxy Propyl)-1-Piperazineacetate*—Seven grams of ethyl 1-piperazineacetate, 6.0 Gm. of 1-chlor 3-hydroxy propane and 7.0 Gm. of potassium carbonate were heated together in an oil-bath maintained at 155–160° C for 7 hours. The reaction was then considered to be complete as judged from the cessation of the evolution of carbon dioxide bubbles.

The excess trimethylene chlorohydrin was removed by distillation *in vacuo*. The semi-solid residue was extracted with a mixture of alcohol and benzene. The extracts were dried over sodium sulphate. Efforts to crystallize the substance were unsuccessful. The solvents were then removed completely by vacuum distillation and a yellow, viscous oil was obtained as a residue, which was assayed.

Assay	N, Found	11 57%
	Calculated for $C_{11}H_{22}N_2O_3$	12 17%

*Ethyl-4-(γ-Chloro Propyl)-1-Piperazineacetate*—Twelve grams of ethyl 4-(γ hydroxy propyl)-1-piperazineacetate was refluxed with 10.0 Gm of thionyl chloride and 6.0 Gm of pyridine for 3 hours. An oil separated out from the benzene solution during refluxing. The benzene solution was poured off from the oil and distilled, the residue from this distillation was negligible.

The oil was treated with dilute ammonium hydroxide to liberate the base. The latter was found to be soluble in aqueous solution which effected its separation from pyridine. The latter was extracted with benzene. The aqueous solution was evaporated to dryness and the residue treated with several portions of alcohol. The alcoholic extract was evaporated, yielding 2.8 Gm of a yellow viscous oil.

Assay	Cl, Found	14 05%
	Calculated for $C_{11}H_{21}O_2N_2Cl$	14 29%

*p-Amino Benzoate of 4-(Carbethoxymethyl)-1-Piperazinepropanol*—1.37 Gm of *p*-amino benzoic acid was dissolved in 25 cc of absolute alcohol. To this solution was added one of 0.23 Gm of sodium dissolved in 20 cc of alcohol. The resulting suspension of sodium *p*-amino benzoate was refluxed for 12 hours with an alcoholic solution of 2.5 Gm of ethyl 4-(γ-chloro propyl)-1-piperazineacetate. The alcoholic solution was filtered from sodium chloride. The filtrate was distilled *in vacuo* which resulted in the isolation of a viscous yellow oil as the residue.

Assay	N, Found	11 62%
	Calculated for $C_{18}H_{27}N_2O_4$	12 03%

*1,4-bis(β-Hydroxy β-Methylhexyl)Piperazine*—This substance was prepared by the procedure of Fourné and Samdahl (4).

*Diphenyl Urethane of 1,4-bis(β-Hydroxy β-Methyl Hexyl)Piperazine*—Three grams (1 mole) of the carbinol and 1.1 Gm (1 mole) of phenyl isocyanate were dissolved in 50 cc of dry benzene. The benzene solution was refluxed for four hours. The hydrochloride of the substance was obtained by the addition of ether containing hydrochloric acid gas. The precipitate was filtered off, washed with ether and dried *in vacuo*.

It was recrystallized from alcohol.

Yield—3.4 Gm of small plate-like, white crystals.  
Melting point—180–181° C.

Assay	Nitrogen.	Chlorine
Found	9 08%	10 90%
Calculated for $C_{23}H_{38}N_4O_4Cl_2$	9 12%	11 36%

The biological tests on compounds reported herein were made in the Biological Research Laboratories of E. R. Squibb and Sons and we gratefully acknowledge their assistance.

#### SUMMARY

(1) A phenyl urethane of 1,4-bis(β-hydroxy β-methyl hexyl)piperazine has been prepared. This substance could not be tested biologically for anesthesia because of its acidity.

(2) The *p*-amino benzoate of 4-(carbethoxymethyl)-1-piperazineacetate has been prepared. A 2% solution of the dihydrochloride is comparatively inactive.

#### BIBLIOGRAPHY

- (1) Gardner and Haenni, *J A C S* 53 (1931), 2768
- (2) Fournau and Samdahl *Bull soc chim*, 47 (1930), 1003
- (3) Gardner and Haenni, *J A C S*, 53 (1931), 2768
- (4) *Bull soc chim*, 47 (1930) 1003

RESEARCH DEPARTMENT OF THE CHEMICAL AND PHARMACEUTICAL LABORATORIES,  
E. R. SQUIBB AND SONS,  
BROOKLYN N. Y.

### A MODIFIED ASSAY PROCESS FOR ALKALI BENZOATES AND SALICYLATES \*†

BY JACOB E. SCHMIDT AND JOHN C. KRANTZ, JR.

#### INTRODUCTION

The assay processes of sodium benzoate and salicylate have been the subject of much investigation during the past three decades. In 1902, Alcock (1) called attention to the simple assay process of the British Pharmacopœia. The method consisted of simple ignition and titration of the resulting carbonate. Certain difficulties in the method were enumerated. This worker suggested the conversion to chloride and argentimetric determination of the chloride. The field was reviewed and studied comprehensively by Clark (2) in 1926. This investigator concluded that the most accurate and uniform results are obtained by either weighing the metal as chloride or extracting the liberated organic acid and weighing.

In the preparation of the official monographs for the forthcoming edition of the Pharmacopœia the method of assay recently described by Henville (3) was investigated in this laboratory.

A modification of the Henville procedure was adopted and the results obtained are set forth in this communication.

#### EXPERIMENTAL

In the method suggested by Henville, a weighed quantity (about 2 Gm.) of the salt is transferred with water to a cylindrical separator. A few drops of methyl orange is added and 30 cc. of neutral ether. Half-normal hydrochloric acid is run in with careful shaking until the indicator shows a distinct red color. The aqueous layer is then transferred to another separator and the water washings of the ether are added. Neutral ether is added and upon shaking the color again becomes yellow. The titration is continued until the second end-point is reached.

In an effort to simplify the method the authors have adopted the following procedure which serves as a rapid and accurate method for Pharmacopœial purposes.

\* Scientific Section A. Ph. A., Madison meeting 1933.

† The expense of this investigation was defrayed in part by a grant from the Research Fund of the AMERICAN PHARMACEUTICAL ASSOCIATION.

The following procedure is applicable for sodium benzoate or salicylate.

"Transfer about 1.5 Gm of the salt, previously dried to a constant weight at 100° C and accurately weighed, to a tall beaker of about 300 cc capacity and add 75 cc of ether and 5 drops of methyl orange T S. Titrate the mixture with half normal hydrochloric acid, mixing intimately the aqueous and ethereal layers by vigorous stirring, until a permanent orange color is produced in the aqueous layer."

The method was tried with samples of U S P sodium salicylate and benzoate which had been previously recrystallized. The results are compared in Tables I and II with those obtained by assaying the same salts by the official process.

TABLE I—PERCENTAGE PURITY

Sample	Sodium Benzoate	
	New Method	U S P X Method.
1	99.10	98.76
2	98.70	98.63
3	98.70	99.21
4	99.50	98.47
5	99.30	101.00
6	99.60	99.63
7	99.10	99.55
8	99.20	
9	99.42	
10	99.22	
11	99.33	
12	99.30	
13	99.30	
14	99.27	
15	99.53	
16	99.30	
17	99.32	
18	99.34	
19	99.52	
20	99.36	
21	99.43	
22	99.41	
23	99.37	
Mean	99.29	Mean 99.32
$r = 0.151$		$r = 0.582$

The statistical analysis of the raw data obtained illustrates the superiority of the new method as far as accuracy is concerned. Thus " $r$ " the probable error of a single determination for sodium benzoate is 0.15 per cent using the new method. By the U S P method  $r = 0.58$  per cent. With sodium salicylate  $r = 0.07$  per cent using the new method and 0.61 per cent when the U S P method was employed. In these calculations

$$r = \pm 0.6745 \sqrt{\frac{\sum(v^2)}{n-1}}$$

The possible sources of error in the U S P X method are many. During the process of ignition the salt tends to be ejected from the crucible, and, even when a small flame is used and the utmost care is taken to prevent sudden overheating, some small portion of the sample is probably lost. The Pharmacopœia directs that

TABLE II—PERCENTAGE PURITY

Sample	Sodium Salicylate	
	New Method	U S P X Method
1	99 60	99 37
2	99 30	99 47
3	99 30	100 00
4	99 32	98 80
5	99 37	99 40
6	99 39	98 40
7	99 53	98 60
8	99 70	99 33
9	99 41	101 00
10	99 39	101 00
11	99 43	
12	99 35	
13	99 50	
14	99 36	
15	99 40	
16	99 31	
17	99 29	
18	99 32	
19	99 42	
Mean	99 40	Mean 99 53
$r = 0.073$		$r = 0.607$

the final temperature should not exceed a dull red heat, but this limitation may be variously interpreted by different operators. After ignition, the carbonized mass is to be disintegrated with a glass rod. The carbonized mass is usually very brittle, and it is very likely that during the process of disintegration small bits are thrown out of the crucible. The pulverized mass is boiled with 50 cc of water and 50 cc of acid, the mixture is filtered, and the residue washed free from acid. The quantity of solution thus obtained varies with different operators, but in all cases a large volume results.

#### CONCLUSION

1. A rapid and more accurate method for the assay of sodium salicylate and benzoate has been devised, based upon the procedure of Henville.

#### BIBLIOGRAPHY

- (1) F. M. Alcock, *Pharm. J.*, 94 (1902), 274.
- (2) A. H. Clark, *Jour. A. Ph. A.* 15 (1926), 6.
- (3) D. Henville, *Analyst*, 52 (1927), 149.

BUREAU OF CHEMISTRY,  
STATE OF MARYLAND DEPARTMENT OF HEALTH

#### MANUFACTURE OF MEDICINAL PRODUCTS IN JAPAN

A survey is being made of medicinal products manufactured in Japan by the Japanese Health Bureau. Among the items represented in considerable quantity are the following. The amounts are in kilograms:

Condurango Extract, 52,292, Ethyl Acetate, 366,120, Solution of Potassium Acetate 55,318, Sodium Bicarbonate, 5,810,181, Mercuric Chloride, not including tablets, 65,154, Mercuric Dextrin, 129,595, Senega Syrup, 180,558, Paste of Tar, 20,159, Calcium Lactate, 34,830.

## THE "CO-FE-CU" FLUIDS AND CERTAIN PHARMACOPŒIAL TESTS\*†

BY H. V. ARNY AND A. TAUB

## INTRODUCTION

This is the thirteenth of a series of papers on the "Co-Fe-Cu" standardized colored fluids which have been published since 1912 by the senior author and his co-workers. These fluids have been described at length in the other papers so at this place, we need only present recipes for their manufacture couched in pharmacopœial phraseology.

## THE CO-FE-CU FLUIDS

*Colorimetric Cobalt T S*—Dissolve about 60 grams of cobalt chloride,  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ , in enough of a fluid made by mixing 25 cc of hydrochloric acid U S P with 975 cc of distilled water to make 1000 cc of test solution. This test solution should be standardized to the  $\frac{1}{4}$  molar strength (59.496 grams  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$  to the liter) by the following assay. Place 5 cc in a 250 cc flask, add 15 cc of 20 per cent sodium hydroxide and 5 cc of solution of hydrogen dioxide (3 per cent), boil for ten minutes, cool, add 2 grams potassium iodide, followed by 20 cc sulphuric acid (1.4). When the precipitate has dissolved, titrate with tenth-normal sodium thiosulphate. Each cubic centimeter of  $N/10$  thiosulphate corresponds to 0.023799 gram  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ .

*Colorimetric Ferric Test Solution*—Dissolve about 50 grams of ferric chloride U S P in enough of a fluid made by mixing 25 cc of hydrochloric acid U S P, with 975 cc of distilled water to make 1000 cc of test solution. This test solution must be standardized to  $\frac{1}{6}$  molar strength (45.054 grams  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$  to the liter) by the hydrochloric acid, potassium iodide, sodium thiosulphate volumetric assay, found under *Ferri Chloridum* (p. ), 10 cc of the test solution is employed. Each cubic centimeter of  $N/10$  thiosulphate corresponds to 0.027032 gram  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ .

*Colorimetric Copper Test Solution*—Dissolve about 65 grams of copper sulphate,  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ , in enough of a fluid made by mixing 25 cc of hydrochloric acid U S P and 975 cc of distilled water, to make 1000 cc of test solution. This test solution should be standardized to the  $\frac{1}{4}$  molar strength (62.43 grams  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  to the liter) by the acetic acid, potassium iodide, sodium thiosulphate volumetric assay found under *Cupri Sulphas* (p. ), 10 cc of the test solution is employed. Each cubic centimeter of  $N/10$  thiosulphate corresponds to 0.024972 gram  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ .

\* Scientific Section A. Ph. A., Madison meeting 1933.

† The work described in this paper was performed at the request of Dr. George D. Beal, chairman of the U S P sub-committee on organic chemicals. Our thanks are due to the Abbott Laboratories, Mallinckrodt Chemical Works, Merck & Company, New York, Quinine and Chemical Works, Charles Pfizer & Co. and E. R. Squibb and Sons, for samples of the chemicals studied and to Messrs. Armao Brown, Cooper, D. Orazio, Ginsberg, Givens, Glockner, Heiko, Hochler, Isacoff, Kleinsinger, Sher Silver, Vigilante, Wight and Zilotto, fourth-year students of Columbia University College of Pharmacy for the preliminary work upon which our final standards were based. [A. and T.]



## POSSIBLE PHARMACOPCEAL APPLICATIONS OF THESE FLUIDS

In 1919, Arny, Kish and Newmark used these fluids to set the color standard for cottonseed oil, in 1923, Arny and Taub used them for setting color standards for (a) the "carbonizable impurities" test for Liquid Petrolatum, (b) the colorimetric suprarenal assay of U S P IX, in 1933, Taub reported "Co-Fe-Cu" matches for the color of cod liver oil, almond oil and castor oil

During the past year, Dr George D Beal requested us to set standards for all of the 'readily carbonizable substances' tests of U S P X. Thanks to the sixteen senior students mentioned in the foot-note, a preliminary study of these tests was made. Three to five different samples of the chemical were treated with concentrated sulphuric acid as directed in U S P X and the resulting color (if any) was determined on the Lovibond tintometer that has been used in our color work of the past twenty years.

A color match was then prepared from the Co-Fe-Cu standard fluids. The results obtained by these students were then checked up by the authors of the present paper with three basic principles in mind: (a) Was the darker color produced by a fair sample? (b) Could the test of U S P X be simplified? (c) Should prescribed quantities be placed upon a uniform basis?

Before discussing these principles, a typical "carbonizable substances" test of U S P X should be quoted:

The solution of 0.5 Gm. of Acetanilid in 5 cc. of sulphuric acid is colorless or only faintly yellow.

If the color matches given below are accepted by the Committee on Revision, the color phraseology given above will be revised. At this time, however, attention should be called to the uncertainty of color description. Thus, among the 51 descriptions of these sulphuric acid color tests of U S P X we find "faintly yellow," "light yellow," "slightly yellow," "light yellow or slightly brown," "transient pinkish tint," "colorless or nearly so," "pale amber" and "no appreciable darkening." These descriptions are bewildering, especially when our tests showed that a sample producing a supposedly "light yellow" color revealed to our eyes a liquid that was greenish rather than yellow.

Taking up the three principles enunciated above, the following comments are in order:

*As to fairness of sample*, we frequently found that the deepest color produced in the preliminary work was that resulting from the action of the acid on a sample that had been in our college stock for some time. In all such cases, we [A and T] set our standard upon the poorest sample of the three or more sent in for this particular test by our manufacturing friends. We must, moreover, hasten to say that the phrase "poorest sample" just used, is scarcely fair, since all of the samples sent us this year were of excellent quality. In fact, we were confronted by the embarrassing situation that many of our recently received samples were colorless after treatment with sulphuric acid.

*As to simplification of testing*, there is little to be said and that topic is carried over to general directions given farther along in this paper.

*As to uniformity in quantities*, we believe that attempts in this direction should be made. The foregoing transcript of the wording of the test for Acetanilid calls

for 0.5 Gm of the chemical and 5 cc of the acid. The 5-cc volume is the proper one for all tests, whenever it is practical. We believe that 5 cc of acid should be used in the chloroform test even as now obtains in the test for carbon tetrachloride. The 2-cc quantities of sulphuric acid prescribed in some thirty of the tests of U S P X are almost impracticable because of the difficulty in determining a match for so small an amount of liquid. Because the fluid to be matched is essentially concentrated sulphuric acid, colorimeter cells can scarcely be used and 2 cc of fluid in a test-tube or bottle is almost unmatchable. Of course, we realize that most of the chemicals tested with 2 cc of acid are expensive. One (Dichloramine) explodes when mixed in the proportion 0.5 Gm in 5 cc of acid, but reacts without violence in the proportion 0.1 Gm to 1 cc of acid. However, a revision as to volume of acid is desirable, and in our findings given below, we have generally put the test upon a 5-cc basis.

In testing the approximately fifty chemicals for which U S P X prescribes the sulphuric acid color test, we discovered twenty blends which provided matches for all of the chemicals tested. These are tabulated below where columns headed "Co," "Fe" and "Cu," respectively, mean the volume (in cubic centimeters or fractions thereof) of the standard cobalt or iron or copper solutions required in 5 cc of the finished standard matching fluid. The only exception is blend "B" which is adjusted to a 10-cc basis. Of course H<sub>2</sub>O means in this case, the amount of water used as the diluent.

TABLE OF MATCHING FLUIDS

	Co	Fe	Cu	H <sub>2</sub> O
"Grayish"				
A	0.1	0.4	0.1	4.4
B	0.3	0.9	0.3	8.5
C	0.1	0.6	0.1	4.2
D	0.3	0.6	0.4	3.7
"Fawn Colored"				
E	0.4	1.2	0.3	3.1
F	0.3	1.2	0.0	3.5
G	0.5	1.2	0.2	3.1
"Yellow"				
H	0.2	1.5	0.0	3.3
I	0.4	2.2	0.1	2.3
J	0.4	3.5	0.1	1.0
K	0.5	4.5	0.0	0.0
L	0.8	3.8	0.1	0.3
"Green"				
M	0.1	2.0	0.1	2.8
N	0.0	4.9	0.1	0.0
O	0.1	4.8	0.1	0.0
"Pink"				
P	0.2	0.4	0.1	4.3
Q	0.2	0.3	0.1	4.4
R	0.3	0.4	0.2	4.1
S	0.2	0.1	0.0	4.7
T	0.5	0.5	0.4	3.6

These are the twenty blends just as we found them as matches for the colors produced by action of concentrated sulphuric acid upon the approximately fifty

chemicals studied by us. There is little doubt that a check-up of our work by the U S P sub-committee on organic chemicals may reduce the matches to 2 "grayish," 1 "fawn," 2 or 3 "yellows," 2 "greens" and 2 "pinks." If this lessening of the number of matches is agreed upon, the wording of the test in the individual monograph may be materially simplified.

#### SUGGESTED OUTLINE OF THE PROPOSED SULPHURIC ACID TEST

*First*, there will be introduced among the test solutions described in the rear pages of U S P XI, specifications for colorimetric test solutions of cobalt, iron and copper, with wording substantially as given in the first part of this paper.

*Secondly*, there should appear among the "General Tests, Processes and Apparatus" of U S P XI a concise description of "Colorimetric Test for Readily Carbonizable Substances in Organic Chemicals."

This description should include

#### I GENERAL DIRECTIONS AND WARNINGS

(a) *Finely Powder the Chemical Prior to Weighing*—Otherwise solution is delayed beyond reasonable limits of time.

(b) *Time Limit*—Matching should be performed not less than 15 or more than 30 minutes after complete solution has been obtained.

(c) *Gas Evolution*—Some chemicals upon addition of the acid produce vigorous effervescence. Do not stopper container until effervescence is completed.

(d) *Matching Containers*—As already mentioned, the strongly acid liquid should not be poured into the average colorimeter cell. In our experience with the 5-cc batches of the acid liquid, we find matching in test-tubes is far from satisfactory. Above all, the operator should be warned not to attempt matching by looking down on the surface of the liquid in a Nessler tube placed on a white surface. Our own experience indicates that the best method of matching is by using a 15-cc ( $\frac{1}{2}$  ounce) glass stoppered "French square" bottle of clear flint glass. In the run of a dozen such bottles, a large percentage of them will be found to be uniform as to interior area, at least as far as the accuracy of this acid test demands.

(e) *The Act of Matching*—If "French square" bottles are employed, the best match is secured by viewing the fluids transversely against a white background (porcelain or white glass plate).

#### II TABLE OF MATCHING FLUIDS

Similar to that given above. With this information in condensed form, the wording of the test in the monograph may be expressed something like this:

The solution of 0.5 Gm. of Acetanilid in 5 cc. of sulphuric acid has no more color than matching fluid A, described under the "test for carbonizable substances" (p.     ).

As to these "carbonizable substances" tests, all remaining to report are the colors produced with concentrated sulphuric acid.

#### COLOR MATCHES

*Blend A*—Acetanilidum, Aethylis Aminobenzoas, Atropina, Atropinae Sulphas, Barbitalum, Barbitalum Solubile, Caffeinae Sodio-Benzoes, Carbonis Tetrachloridum, Carbomalum

Chloramina Chloroformum, Cocaina, Glusidum, Glusidum Solubile, Phenobarbitalum Pilocarpinæ Nitras, Strychninæ Sulphas, Theobrominæ Sodio Salicylas and Theophyllina

*Blend B* —Glycerinum

*Blend C* —Acidum Salicylicum

*Blend D* —Caffeina

*Blend E* —Pelletierinæ Tannas

*Blend F* —Cocainæ Hydrochloridum

*Blend G* —Procainæ Hydrochloridum

*Blend H* —Emetinæ Hydrochloridum

*Blend I* —Physostigminæ Salicylas

*Blend J* —Caffeina Citrata

*Blend K* —Acidum Citricum

*Blend L* —Strychninæ Nitras

*Blend M* —Quinidinæ Sulphas Quinina, Quininæ Bisulphas Quininæ Dihydrochloridum Quininæ et Ureæ Hydrochloridum, Quininæ Sulphas

*Blend N* —Cinchophenum

*Blend O* —Santoninum

*Blend P* —Chloralis Hydras Dichloramina

*Blend Q* —Acidum Acetylsalicylicum, Acidum Benzoicum

*Blend R* —Guaiacolis Carbonas

*Blend S* —Codeina, Codeinæ Sulphas

*Blend T* —Acetphenetidinum

The foregoing tabulation suggests a number of special remarks explaining certain deviations from the fixed rules outlined above

*Blend A* represents a grayish tint just beyond the clear color of distilled water Among the chemicals listed in this group are found some that are directed in the U S P X to be "colorless or nearly so" Among these are the two barbital, chloral hydrate, eucaine hydrochloride, dichloramine and procaine hydrochloride. In our experiments, at least one of the samples of each chemical just mentioned showed a faint suggestion of color, hence we included all of these chemicals in the group matched by "Blend A"

*Lactic Acid* —U S P X gives a sulphuric acid test for this chemical The specifications call for "no dark zone," hence it fell outside the class of exact color matching

*Carbon Tetrachloride and Chloroform Tests* call for the shaking of 20 or 40 cc. of the chemical with 4 or 5 cc of concentrated sulphuric acid in a glass stoppered cylinder and viewing color of acid after shaking We recommend that both tests be run with 40 cc of the chemical and 5 cc of the acid The surplus of the chemical is to be decanted and the acid residue transferred to the 15 cc glass stoppered "French square" bottle for matching against the standard blend

*Codeine* —The pink color produced is not so transient as the Pharmacopœia suggests That is, the acid matched the same pink fluid (Blend S) both 15 and 60 minutes after complete solution

*Dichloramine* —This test must be handled with care When 0.5 Gm is mixed with 5 cc of sulphuric acid, an explosion occurs For this reason, as mentioned above, we advise the present U S P proportion 0.1 Gm to 1 cc of the acid

*Gluside* —We recommend that the heating of this chemical with the acid be continued at 48° to 50° C but we suggest that the phrase "on a water bath" be deleted

## HYOSCYAMINE HYDROBROMIDE AND SCOPOLAMINE HYDROBROMIDE

While U S P X gives the sulphuric acid test for these chemicals, we find it is not practical since the yellow color produced in both cases is largely due to bromine

*Pelletierine Tannate*—The process of U S P X is to view the color change as a "spotting test" upon a white porcelain surface. We recommend that the residue be treated with 2 cc of sulphuric acid and that this be matched in the 15-cc "French square" bottle

*Liquid Petrolatum*—This color test was reported in a previous paper (2). At this time we need only state that the match then reported (Co, 15 cc, Fe, 30 cc, Cu, 0.5 cc, H<sub>2</sub>O 0.0 cc) is more amber than the five yellows (H — L) of the tabulation given above)

## MATCHING THE COLOR OF FIXED OILS

In previous papers (3) we have published the composition of blends made from the Co-Fe-Cu fluids for matching the color of cottonseed oil, cod liver oil, almond oil and castor oil. For details, the reader is referred to the original articles listed in the bibliography with which this paper ends. Chairman Beal has requested us to attempt to devise a blend matching the color of halibut liver oil. Securing 8 commercial samples of this now popular oil, we were surprised to note that the color ranged from a light yellow to an amber that was almost brown. As all of the oil samples examined were marketed for medicinal purposes and, as the darker samples in our opinion are not attractive, we picked as our "average sample" one that was darker than 3 samples and lighter than 5 samples. It appears to us that the first step, if the color of halibut oil is to be standardized will be the setting, by mutual agreement, of a proper shade of yellow for medicinal halibut oil. Tentatively, we have ventured to select our "average sample" and this sample is matched by a blend of Co, 4.5 cc, Fe, 10 cc, Cu, 0.5 cc and H<sub>2</sub>O, none. This halibut oil problem was submitted to us only recently. Our conclusions are therefore tentative and we recommend that the marketers of this new product give attention to further refining and to establishing a more uniform color.

## CONCLUSIONS

1 Report of the study of the color changes produced when certain U S P chemicals are treated with concentrated sulphuric acid, and a tabulation of 20 blends of the "Co-Fe-Cu" standardized colored fluids by which the colors produced by the 'readily carbonizable substances' test of U S P X upon fifty chemicals may be accurately matched

2 Consideration of the standardizing of the color of official fixed oils already reported by the authors, and publication of a "Co-Fe-Cu" color blend which matches an "average sample" of halibut liver oil

## BIBLIOGRAPHY

- (1) (a) *Am Drug* 60 (1912), 35, (b) *Proc 8th Int Cong App Chem* 26 (1912) 319, (c) *D A Apoth Ztg* 33 (1913) 165 (d) *Drug Circ*, 57 (1914) 131, (e) *J Frank Inst*, 180 (1915) 199, (f) *Jour A Ph A* 4 (1915) 1294 (g) *Ind & Eng Chem*, 8 (1916), 309, (h) *Ibid*, 11 (1919) 950, (i) *Jour A Ph A*, 12 (1923) 839 (j) *Ibid*, 16 (1927), 116, (k) *Am J Pharm* 104 (1932) 272, (l) *Jour A Ph A* 22 (1933) 195
- (2) See item (i) in Reference (1)
- (3) See items (h and l) in Reference (1)

# BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually. Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland, School of Pharmacy, N W cor Lombard and Greene Sts, Baltimore, Maryland

## PHARMACOPŒIAS AND FORMULARIES

- Antun  
New Pharmacopœia of Yugoslavia  
*Pharm Ztg*, 78 (1933), 952  
Gjaldbock, J K  
Chemicals of the Danish Pharmacopœia, 1933  
*Arch Pharm Chem* 40 (1933) 435 479, 511  
Haane, Henning  
Danish Pharmacopœia, 1933  
*Farm Revy*, 32 (1933), 457 473 489 541  
Madsen, E Host  
Notes on the nomenclature of the Danish Pharmacopœia, 1933  
*Arch Pharm Chem*, 40 (1933) 489  
Meyer Karl  
New Danish Pharmacopœia  
*Pharm Ztg*, 78 (1933), 819

## PHARMACEUTICAL PREPARATIONS

- Babitsch, S  
Preparation of mixtures, such as solution of potassium arsenite with compound tincture of cinchona, Tinct amara and Tinct ferri pomati  
*Pharm Zentralh* 74 (1933), 563  
Brown, C L M, and Lum E A  
Agar-agar and paraffin emulsions  
*Pharm J* 131 (1933) 341  
Froboese V  
Absorption of lead from tin-lead tubes by tooth pastes  
*Z Untersuch Lebensm*, 65 (1933) 176, through *Chem Abstr*, 27 (1933) 4625  
Jermstad, Axel, and Ostby, Ottar  
Contribution to the determination of the composition of Fowler's solution  
*Pharm Acta Helv*, 8 (1933), 144  
Lepke, H  
Technic of preparing ointments containing mechanically pulverized substances  
*Apoth-Ztg*, 48 (1933), 1061  
Luck, J A W  
Syrup of Tolu  
*Jour A Ph A*, 22 (1933) 844

- Ruf, R  
Modern preparation of pills  
*Pharm Weekbl*, 70 (1933), 879  
Van der Wielen  
Some Prescription difficulties  
*Pharm Weekbl*, 70 (1933), 923

## PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

- Anderson, Hamilton H, et al  
Toxicity of alpha-dinitrophenol  
*J A M A*, 101 (1933), 1053  
Carleton, Alice  
Uses and dangers of cosmetics  
*Brit Med J*, 1 (1933), 999  
Carrara, G  
A first pharmacological application of azoxy compounds  
*Ann chim applicata*, 23 (1933), 140, through *Chem Abstr*, 27 (1933), 4345  
Chen, K K, and Chen, A Ling  
Pharmacological action of ten amines related to ephedrine and tryptamine  
*Jour A Ph A*, 22 (1933) 813  
Choag, André  
Presence and conservation of biologic properties in powdered organs  
*J pharm chim*, 18 (1933), 138  
Marshall, Philip G  
The gonadotropic hormones (p-factors) IV  
Preparation of extracts for clinical use and their standardization  
*Biochem J* 27 (1933), 621, through *Chem Abstr*, 27 (1933), 4627  
v Mikó, Julius  
Length of time insulin solutions retain their activity  
*Pharm Zentralh*, 74 (1933), 561  
Newman, Ben A  
Phenolphthalein intoxication  
*J A M A*, 101 (1933), 761  
Smith, Maurice et al  
Pharmacologic action of phosphorous acid esters of phenols  
*J Pharmacol & Exper Therap*, 49 (1933) 76

Waud, Russell A

Further studies on extracts made from holly  
*Proc Soc Exptl Biol Med*, 30 (1932), 393,  
through *Chem Abstr*, 27 (1933), 4344

## BOTANY AND PHARMACOGNOSY

Bartholome, E

Flowers of *Anthemis Nobilis*  
*J pharm Belg*, 15 (1933) 595

Bondeson, Wolmar

*Euphorbia pilulifera* herb

*Farm Revy*, 32 (1933), 537

Bridel, M., and Charaux, C

Composition of buckthorn bark I

*Bull soc chim biol*, 15 (1933), 642, through  
*Chem Abstr*, 27 (1933) 4626

Edman, Gösta

*Silica* in *Quassia amara* L

*Farm Revy*, 32 (1933), 441, 493 509, 521, 545

Graham, Katherine

Non-preexistence of azulene in milfoil

*Jour A Ph A*, 22 (1933), 819

Munesada, T

Pharmacognostic investigation of the Japanese  
drug "Nindo"

*J Pharm Soc Japan*, No 617 (1933), 128

## ALKALOIDS AND GLUCOSIDES

Evans, Claire and Goodrich, F J

Washington belladonna and methods of assay  
*Jour A Ph A* 22 (1933), 824

Fulton, Charles C

Identification of cocaine and novocaine

*Am J Pharm*, 105 (1933) 374

Glycart, C K

Report on microchemical methods for alkaloids  
*J A O A C*, 16 (1933) 345

Glycart, C K

Report on the determination of ergot alkaloids  
by chemical methods

*J A O A C*, 16 (1933), 387

Groothoff A and Henry T A

Preparation, analysis and standardization of  
totaquina

*Rev malarologia* (reprint) 12 (1933) 1-7,  
through *Chem Abstr*, 27 (1933), 4625

Lapp, Ch

New method for the polarimetric determination  
of quinine and its salts

*Ann chim anal chim appl*, 15 (1933), 289,  
through *Chem Abstr*, 27 (1933) 4627

Lillig, R

Concentrated sulphuric acid and concentrated  
sulphuric acid with additions as alkaloidal  
reagents

*Pharm Ztg*, 78 (1933), 910, 921

Sohl, W E, and Shriner R L

Structure of cuscohygrine

*J Am Chem Soc*, 55 (1933), 3828

Vinogradova, L N

Conductimetric determination of dilute solu-  
tions of alkaloids and of morphine in com-  
mercial opium

*J Appl Chem Russ*, 6 (1933) 150, through  
*J Soc Chem Ind*, 52 (1933), 652

## ESSENTIAL OILS

Dafert, O, and Capesius, V

*Chenopodium ambrosioides* oil

*Pharm Presse, Wiss-prakt Heft* (1933), 69

Freise, Fred W

Brazilian sandalwood oil

*Pharm Zentralh*, 74 (1933), 517

## ANALYTICAL METHODS AND RESULTS

Ahrens, C

Testing of santonn

*Apoth Ztg*, 48 (1933) 980

Baggesgaard-Rasmussen, H, and Reimers, F

Acid-base titrations in alcohol-water media

*Dansk Tids Farm*, 7 (1933), 164

Balls, A K, and Hale, W S

Note on the determination of hydrogen per-  
oxide

*J A O A C*, 16 (1933), 395

Brandrup, W

Ultramicroscopic examination of the system

Ointment bases and incorporated sulphur

*Apoth-Ztg*, 48 (1933), 993

Burlage, H M

Report on methods for the assay of santonn

*J A O A C*, 16 (1933) 346

Callaway, Joseph

Report on the analysis of benzyl compounds

*J A O A C*, 16 (1933), 362

Carol Jonas

Report on the determination of hexylresorcinol

*J A O A C*, 16 (1933), 384

Ferrante, J, and Bloom, A

Identification of carbonyl compounds with 2,4-  
dinitrophenylhydrazine

*Am J Pharm*, 105 (1933), 381

Fisher, Harry J

Report on the quantitative determination of  
calcium gluconate

*J A O A C*, 16 (1933), 379

Freudweiler, R

Detection of falsification of drugs by micro-  
scopical examination under filtered ultra-  
violet light

- Pharm Acta Helv*, 8 (1933), 147  
 Grant, Ernest H  
 Report on a method for the determination of phenolsulfonates  
*J A O A C*, 16 (1933) 364  
 Gross, C R  
 Sources of error in the Gutzeit method for arsenic  
*J A O A C*, 16 (1933) 398  
 Gstürner F  
 Evaluation of scammony resin  
*Süddent Apoth-Ztg*, 73 (1933), 400, through *Chem Abstr* 27 (1933), 4347  
 Hubbard, W S, and Dayharsh, C A  
 Report on the quantitative determination of sulphonal and trional  
*J A O A C*, 16 (1933), 366  
 Karsten, P  
 Determination of copper in reduced and pulverized iron  
*Pharm Weekbl*, 70 (1933) 914  
 Knight, N L  
 Report on the quantitative determination of guaiacol  
*J A O A C* 16 (1933), 369  
 Kunke, W F  
 Report on a quantitative method for the determination of ether  
*J A O A C* 16 (1933) 348  
 Lehrman, L, *et al*  
 Organic reagents in volumetric analysis  
*J Am Chem Soc* 55 (1933) 3509  
 Neugebauer, H  
 Identification of homeopathic potencies of kamala  
*Pharm Presse, Wiss-prakt Heft* (1933) 75  
 Raquet, D and Pinte P  
 Characterization and differentiation of phosphites and hypophosphites in mixtures of the two  
*J pharm chim* 18 (1933), 89  
 Rowaan P A  
 Evaluation of arsenic-containing insecticides  
*Pharm Weekbl*, 70 (1933), 849  
 Schlemmer, F and Siegert M  
 Differences in the alcohol numbers of the official tinctures  
*Apoth-Ztg*, 48 (1933), 932  
 Schulek, E, and Gervay V  
 Determination of hexamethylenetetramine in medicinal preparations  
*Z anal Chem* 92 (1933), 406 through *J Soc Chem Ind* 52 (1933) 651  
 Shupe Irwin S  
 Report on microchemical methods for synthetic drugs  
*J A O A C*, 16 (1933), 391  
 Stasiak, A and Kerenyi B  
 Assay of pharmaceutical preparations of pepsin  
*Pharm Zentralh*, 74 (1933), 519, 531  
 Stschigol, M  
 Quantitative determination of chloroform, pure and in medicinal mixtures  
*Pharm Zentralh*, 74 (1933), 529  
 Sykes, C H  
 Use of diphenylamine in estimating small quantities of trinitrin  
*Pharm J*, 131 (1933), 267  
 van Giffen, H J  
 Micro-determination of iodine in thyroid gland and other substances  
*Pharm Weekbl*, 70 (1933) 910  
 Warren L E  
 Report on the assay of ipomea, jalap and podophyllum  
*J A O A C*, 16 (1933), 375  
 Weissmann, G  
 Determination of phenacetin, aspirin and anti febrin  
*Z anal Chem* 93 (1933) 31, through *J Soc Chem Ind*, 52 (1933) 732  
 Weissmann, G A, and Jampolskaja M M  
 Quantitative determination of silver in aqueous solutions of protargol in presence of adrenaline  
*Pharm Zentralh*, 74 (1933), 504
- ### INORGANIC CHEMICALS
- Huerre, R  
 Black sulphide of mercury  
*J pharm chim*, 18 (1933) 145  
 Taylor, T I, and Cone, Wm H  
 Preparation and properties of silver sols by reduction of silver halides with formaldehyde  
*J Am Chem Soc*, 55 (1933), 3512
- ### ORGANIC CHEMICALS
- Dov A W  
 Homodesoxyveronal and some of its homologs  
*J Am Chem Soc*, 55 (1933), 3871  
 Gardner, J H and Schneider J H  
 New local anesthetics containing the piperazine ring  
*J Am Chem Soc*, 55 (1933), 3823  
 Haller H L, and Schaffer P S  
 Preparation of dihydroteneone  
*Ind Eng Chem* 25 (1933) 983  
 Muset J, and Dumont P  
 Study of the chemical properties of some urethanes  
*J pharm Belg*, 15 (1933), 564, 580



Worrall D E

Some hydroxy and amino esters of yohimbic acid

*J Am Chem Soc*, 55 (1933), 3715

## CLINICAL METHODS

Gfeller, Hans

Contrast materials for clinical tests

*Pharm Acta Helv*, 8 (1933), 131

Monnet R

Detection of quinine in urine by the erythro-quinine reaction

*J pharm chim*, 18 (1933), 94

## AN ASSAY METHOD FOR FLUIDEXTRACT OF IPECAC, U S P \*

BY MORTIMER BYE,<sup>1</sup> R E SCHOETZOW,<sup>2</sup> J W E HARRISSON<sup>3</sup> AND L DALE SEIF<sup>4</sup>

## INTRODUCTION

Several different methods for the assay of Fluidextract of Ipecac have been proposed since the method of the U S P X has been found to yield troublesome emulsions. The methods of Palkin and Watkins (1), the automatic extractor method of Palkin, Murray and Watkins (2) and a modified U S P IX method were reported by Bliss and collaborators (3). Other methods considered were those of Leger (4) and the British Pharmacopœia method (5).

After careful study of these methods two were thought to be worthy of further work by collaborators and a third method which is essentially the U S P Type C Assay Method with certain modifications were proposed. These three methods were compared with the present U S P X method.

## METHODS

1 *U S P X Method*.—Follow U S P Type Process D, using plenty of ether in the first shake outs. Continue extractions until no cloudiness results when tested with mercuric potassium iodide, if possible. Do not allow final ether solution to go to dryness on the steam bath, but add 2 or 3 cc of alcohol or ether to the last few cc remaining, again evaporate to 2 or 3 cc and add 0.1N H<sub>2</sub>SO<sub>4</sub> before evaporating off last traces of solvent.

2 *Palkin and Watkins Method (Hand Extraction)*.—Measure 20 cc sample into a 100-cc volumetric flask, add about 5 cc N sulphuric acid and evaporate on a steam bath with the aid of a current of air to about 10 cc. Then, while rotating the flask, add about 30 cc of water, cool and make up to the mark with water. Mix well and allow to stand over night. Decant the supernatant liquid through a dry filter, rejecting the first few cc. Then proceed by either Method 2 or 3. Pipette 20 cc filtrate (representing 4 cc original sample) into a separatory funnel. Add 2 cc of ammonia T S and completely extract the alkaloids with peroxide free ether until no cloudiness results with potassium mercuric iodide. Evaporate the combined ether solutions on steam bath and finish as directed in U S P X, using precautions under No. 1 about evaporating last traces of solvent.

3 *Palkin, Murray and Watkins (Automatic Extractor)*.—Pipette 20 cc of filtrate (in Method 2) into an automatic extractor for liquids lighter than water which has been fitted to a 200-cc flask. Add 50 cc of water, 2 cc of ammonia T S and 50.0 cc of peroxide free ether, shake gently to prevent deposition of solid matter on bottom of extractor, then add ether until about 75 cc have passed into the flask. Extract on a steam bath for about two hours. Separate

\* Permission granted to publish by Chairman E Fullerton Cook, Revision Committee U S P

<sup>1</sup> Mortimer Bye, formerly Scientific Director Wm S Merrell Co. <sup>2</sup> R E Schoetzow, Analytical Laboratories E R Squibb & Sons. <sup>3</sup> J W E Harrison, LaWall & Harrison Consulting Chemists. <sup>4</sup> L Dale Seif, Analytical Laboratories, The Wm S Merrell Company.

ether from the aqueous layer and add to main concentrate in the flask. Evaporate and titrate as directed in U S P X, using precautions under No. 1 about evaporating last traces of solvent.

4 *U S P Type C Process*—Proceed as U S P X Type Process C for fluidextracts using 10-cc sample and 100 cc of ether. Shake and allow to stand over night and shake again as directed in U S P. Decant a 50 cc aliquot representing 5 cc of sample. Carry out evaporation and titration as under No. 1.

The fluidextract used was carefully prepared from *ippecac* furnished by the U S P Revision Committee and peroxide-free ether was used in the assays.

## RESULTS

TABLE I

	R. E. Schoetzow, Gm Alkaloids/100 cc.	L. D. Seif Gm Alkaloids/100 cc.
Method 1	2.216 2.209	2.204
Method 2	2.343	2.003
Method 3	2.251	
Method 4	2.155 2.162	2.213 2.204

## COLLABORATORS' COMMENTS

R. E. Schoetzow "We prefer Method 4 using paper as the absorbent. Method 1 requires too much time as it took more than a whole day to complete the analysis according to this method. A two-hour extraction with the mechanical extractor mentioned in Method 3 is not sufficient, about four and one half hours were required for complete extraction of the alkaloid during this step."

L. D. Seif "Method 1. No emulsion was formed when no water was added to the fluidextract, but a slight amount of water caused troublesome emulsions. Method 2. Emulsions also occurred in this hand-shake-out method. Method 3. The mechanical extractor did not extract all of the alkaloid in three hours. It was necessary to transfer to a separatory funnel and shake out by hand. Method 4. This method was found to be the least troublesome. Paper was used as the absorbent. One assay, using sawdust, gave slightly lower results."

A series of assays was then run, using ether which gave a positive test for peroxide when tested with cadmium potassium iodide. The results were low and did not check in duplicate assays, confirming the conclusions of other workers (6) that peroxide-free ether should be used in this assay. These results are given in Table II.

TABLE II

	Ether Containing Peroxide Gm Alkaloids/100 cc	Peroxide Free Ether Gm Alkaloids/100 cc.
Method 1	1.16 1.29	1.435 1.425
Method 2	1.06	1.396
Method 4	1.13	1.42

These two series of assays indicated that Method 4 was satisfactory when peroxide-free ether was used, but there was some question as to what absorbents could be used since it had been shown by Morrison and Bliss (7) that sawdust retained a rather high percentage of certain alkaloids. Two series of assays were run using asbestos, paper, exhausted *ippecac* and sawdust as the absorbents. All the

absorbents were free from alkaloids when tested by the U S P test for alkaloids in absorbents. The exhausted ipecac was used with the thought that it should give up all of the absorbed alkaloids rather easily and serve as a control on the other three absorbents. In one series the absorbents were impregnated with Fluidextract of Ipecac (of different manufacture than that previously reported) and in the other series with a solution containing a known amount of emetine hydrochloride. The results are given in Table III.

TABLE III

	Fluid. Ipecac, Gm Alkaloid/ 100 cc	Solution Made to Contain 0.0755 Gm Emetine (as Alkaloid) per 10 cc Gm Alkaloid/10 cc
Sawdust absorbent	1.464	0.0711
	1.474	0.0680
Paper absorbent	1.55	0.0752
	1.53	0.0781
Asbestos	1.51	0.0762
		0.0772
Exhausted ipecac	1.522	0.0752
	1.541	0.0776
Straight ether shake out		0.0752

These assays indicate that either asbestos or paper is a suitable absorbent and that while sawdust does not retain as great an amount of emetine as has been reported, when used with other alkaloids, still it gives low results and should not be used as an absorbent.

The results obtained in the three tables showed that the following method (Method 4) was the most practical method, that the results compare favorably with those of the present U S P method and that uniform results could be secured in different laboratories when peroxide-free ether was used.

## METHOD

From a pipette measure 10.0 cc of Fluidextract of Ipecac into an evaporating dish containing either absorbent paper or asbestos which gives no test for alkaloids when treated according to the U S P method for absorbents. Dry at a temperature not exceeding 60° C and transfer to a flask containing 100.0 cc of peroxide free ether. Stopper, shake well and allow to stand for five minutes. Then add 10 cc of ammonia T S using a portion of the ammonia T S to rinse traces of absorbent from the evaporating dish. Stopper tightly and shake for one hour in a mechanical shaker or occasionally, by hand for a period of about two hours. Allow the mixture to stand over night and again shake occasionally during a one hour period. Allow the absorbent to settle and decant 50.0 cc of the clear supernatant liquid into a separatory funnel. Completely extract the alkaloid from the ethereal solution with approximately normal sulphuric acid, using 15 cc the first time and 10 cc for each succeeding extraction, filtering each portion into a second separatory funnel. Extraction should be continued until no visible reaction is noted in the sulphuric acid solution when tested with mercuric potassium iodide, T S.

To the combined acid solution add about an equal volume of peroxide-free ether, make alkaline with ammonia T S and extract with successive portions of ether until no visible reaction takes place when a few cc are evaporated to dryness, dissolved in dilute sulphuric acid and tested with mercuric potassium iodide, T S. Filter each portion into a 200-cc flask and evaporate carefully on a steam bath, nearly, but not quite to dryness. Add 5 cc of ether and again evaporate nearly to dryness. Add 10.0 cc of 0.1N sulphuric acid and heat on steam bath to effect complete solution and to remove all of the ether. Cool, and titrate excess acid with 0.1N sodium hydroxide using methyl red indicator. Each cc of 0.1N sulphuric acid corresponds to 0.0240 Gm of ether-soluble alkaloids of ipecac.

Another sample of fluidextract was assayed by the collaborators by the above method using asbestos or paper as absorbents. The results on both the first and second samples are given in Table IV

TABLE IV

	Sample 1	Sample 2	
	Paper Gm Alkaloids/ 100 cc	Paper Gm Alkaloids/100 cc.	Asbestos.
R E Schoetzow	2 162	1 532	1 50
		1 550	1 52
J W E Harrison			1 61
			1 56
L D Seif	2 213	1 55	1 51
	2 204	1 53	

The average of three assays on Sample 1 is 2 193 with a low of 2 162 (1 4%) and a high of 2 213 (0 91%)

The average of 9 assays on Sample 2 is 1 54 with a low of 1 50 (2 59%) and a high of 1 61 (4 56%)

## CONCLUSIONS

A practical method for Fluidextract of Ipecac is presented which does not yield troublesome emulsions, and by which uniform results may be secured by different analysts

The value of peroxide-free ether for the assay and the retention of alkaloids by sawdust is confirmed

## REFERENCES

- (1) S Palkin and H R Watkins, *Jour A Ph A*, 13 (1924) 694
- (2) S Palkin, A G Murray and H R Watkins, *Ind Eng Chem*, 17 (1925), 612-614
- (3) A R Bliss, *J O A C*, 10 (1927), 359-362
- (4) E Leger, *J pharm chim*, 6 (1927), 501-505
- (5) The British Pharmacopœia 1932 page 175
- (6) L E Warren and W T McClosky, Report on the Assay Procedures for a Number of Drugs and Pharmaceutical Preparations, page 49
- (7) R W Morrison and A R Bliss, *Am J Pharm*, 104 (1932), 590-593

## MISCIBLE FLUIDEXTRACT OF IPECAC \*

BY J A REESE AND W G CROCKETT

The chief factors to be considered in the manufacture of fluidextract of ipecac are (1) the choice of a menstruum which will exhaust the drug and (2) the obtaining of a fluidextract which will mix with syrup to form a permanent syrup of ipecac. Seventy-three per cent alcohol is effective as a menstruum but produces a fluid extract which is not miscible with syrup. Thirty-seven per cent alcohol, as used in U S P X, renders extraction difficult and does not remove the resins which cause clouding when the fluidextract is mixed with syrup

A process has been suggested to Sub-Committee No 11 of the Revision Committee of the U S P, wherein the drug is exhausted with 73% alcohol, the alcohol

\* Section on Practical Pharmacy and Dispensing, A Ph A, Madison meeting 1933

is then recovered by distillation and the fluidextract finished so as to contain 33% alcohol. The authors claim no credit for the method. This paper merely sets forth the results we obtained in following the method suggested.

#### METHOD

Ipecac in fine powder	1000 Gm
Menstruum { alcohol 3 volumes	
{ water 1 volume	

Exhaust the drug by percolating slowly, after macerating 48 hours. Reduce the entire percolate to 1000 cc by evaporation at a temperature not exceeding 60° C and add 2000 cc of water. Filter until brilliantly clear and evaporate the filtrate to 600 cc. To this add 300 cc of alcohol, mix, assay and adjust with a mixture of 1 volume of alcohol and 2 volumes of water.

#### EXPERIMENTAL

Duplicate assays on the powdered ipecac used showed 2.12% and 2.13% of ether-soluble alkaloids. Two 200-Gm portions of drug were taken and a fluidextract prepared from each by the method previously described. The percolate from 200-Gm portion No. 1 measured 2250 cc when the drug was exhausted. That from 200-Gm portion No. 2 measured 2150 cc. When these percolates were later concentrated, diluted with water, filtered and assayed, the filtrate from No. 1 contained a total of 3.48 Gm of ether-soluble alkaloids, while that from No. 2 contained 3.49 Gm. This shows an average recovery of alkaloids amounting to 82%. This loss of alkaloids was due, certainly in a large part, to their removal in the dense resinous mass which was filtered off. According to the proposed method this mass is not washed to free it of alkaloids.

Two fluidextracts were previously prepared by this method from another lot of U. S. P. drug and made up to approximate volume without actually assaying them. Results are recorded in the following table.

TABLE OF ASSAYED FLUIDEXTRACTS

Sample No	Age	Condition
1	6 months	Clear
2	6 months	Clear
Unassayed Fluidextracts		
1	14 months	Clear
2	14 months	Clear

Syrup of ipecac was prepared from each of these four fluidextracts. At the end of six months all were clear. The syrups made from the unassayed fluidextracts show a faint deposit at the end of fourteen months. Syrups were made from fluidextracts labeled "U. S. P.," obtained from two reliable manufacturing houses. Voluminous precipitates formed in them in the course of a few days.

Attempts were made to prepare fluidextracts by the U. S. P. X process from the two lots of powdered ipecac used in this work. The menstruum would not pass through the drug, even when no packing in the percolator was employed.

## DIFFICULT PRESCRIPTIONS \*

## "IT CAN BE DONE"—SECOND SERIES

BY J LEON LASCOFF, PHAR D

In 1930, I presented a paper (with demonstrations) before the Section on Practical Pharmacy and Dispensing of the A PH A. The title of my paper was, "It Can Be Done." At that time, I was requested to continue my series and to make another report before this same section. However, being busy with the Revision Committee of the United States Pharmacopœia and the revision of our Recipe Book, I did not find time to continue this work. During the last few years, however, I have collected a number of interesting prescriptions which actually were presented for dispensing at our Pharmacy. On this occasion I am going to offer these to you for discussion.

Frequently (judging from the numerous requests for aid which we have received), the pharmacist will be confronted with prescriptions which present difficulties in compounding. In some cases, he will mix the components in the order in which they are named and place a "shake well" label on the bottle, "to cover a multitude of sins."

I am presenting herewith a number of difficult prescriptions which have come to our Pharmacy. At first glance it seems impossible to compound them properly, however, after a little experimental work, we were usually able to dispense it—"secundum artem." After all, we are pharmacists, and it is our responsibility and duty to properly compound medications. The methods used for this set of prescriptions, may be applied not only to these but to many others—I have found from my experience that it "Can Be Done."

*Prescription No 1*

℞

Ext Bellad	0 3
Ext Opu	0 2
Bism Subnit	25 0
Mag Ust	10 0
Sod Bicarb	35 0
Aq Menth Pip ad	180 0

If this prescription is compounded as written, a solid rock-like mass soon forms at the bottom of the bottle, which it is impossible to break up, and the patient cannot take the medicine properly. However, the addition of  $\frac{1}{2}$  fluidounce of glycerin adds sufficient viscosity to hold the heavy powders in perfect suspension.

*Prescription No 2*

℞

Phenobarbital	grains	vi
Pot Brom	drachms	iv
Syr Auranti	drachms	vi
Water to make	ounces	iii

---

\* Section on Practical Pharmacy and Dispensing, A PH A, Madison meeting, 1933

If this preparation is compounded as written, the Phenobarbital, which is insoluble, settles to the bottom. If it is compounded, using the soluble Phenobarbital Sodium, we still obtain a cloudy mixture, more uniform than the other, but not quite clear. If, however, the Syrup of Orange is replaced by simple syrup which besides having no alcohol (Syrup of Orange contains among other things, citric acid), has a higher water content, we have a clear solution with no precipitation.

*Prescription No 3*

R̄

Pot Bromide	drachms	iv
Chloretone	grains	xv
Aq Menth Pip	ounces	ii
Syrup to make	ounces	iv

There are three ways of compounding this. *First* The addition of alcohol to dissolve the Chloretone. *Second* The addition of Acacia to form a suspension. *Third* Simply boiling the mixture until a clear solution results.

*Prescription No 4*

R̄

Codein Sulph	grains	iii
Tereben	drachm	i
Ol Oliv	drachm	i
Divide in capsules		xii

Once again we find more than one way to compound this preparation. *First* The addition of the Terebene and Olive Oil to a dry capsule, large enough to contain the volume, followed in this case by dropping into each capsule a  $\frac{1}{4}$  grain Codeine Sulphate tablet triturate. *Second* Dissolve Codeine Alkaloid in the Olive Oil by heat, add the terebene and seal the capsules.

*Prescription No 5*

R̄

Iodi	0	5
Ol Oliv	90	0

We find that the Iodine will not completely dissolve in the Olive Oil, nor will it combine with the fatty acids in the Oil as it will with some (example, Sesame Oil). Therefore, it requires either that we heat the oil to dissolve the Iodine, by which process it will undoubtedly settle out, or that we dissolve the Iodine in a little ether and quickly add the Olive Oil by which means we get a clear solution which remains so.

*Prescription No 6*

R̄

Creosot Carb	drachm	ss
Acetphen	drachm	ss
Sacch Lact	g	s
Mix and make into capsules		

If the above is compounded as written, the product will always be moist and oily. On the other hand, the addition of sufficient magnesium carbonate in no way

interferes with the therapeutic action of the mixture and at the same time keeps the powder dry and makes a satisfactory product

*Prescription No 7*

℞		
Ichthyol		2 0
Menthol		0 3
Camphor		0 6
Glycerin		10 0
Olive Oil		30 0
Lime Water to make		180 0

If compounded as written, this makes an unsightly mess, as the oily constituents rise to the top and the aqueous remain at the bottom. The proper way to compound this is as follows. Liquefy the Camphor and Menthol by triturating them together, add the Olive Oil, to this add fifteen grains of tragacanth as a suspending agent. The Ichthyol may then be dissolved in the Glycerin and Lime Water and these added to the other components. This gives a homogeneous mixture which will not settle out on standing.

*Prescription No 8*

℞		
Camphor	drachms	11
Oil of Turpentine	ounces	11
Water	ounces	11
Oleic Acid sufficient		

In the above prescription the physician evidently has in mind that the Oleic Acid will act as an emulsifying agent for the Oil and Water. Unfortunately, however, this is not the case. If compounded as written, two distinct layers will form with the Oleic Acid strongly favoring the Oil. To properly dispense this requires the procedure. Dissolve the Camphor in the Turpentine, add this to the yolk of one egg in a bottle, gradually, shaking after each addition. When all has been added, add the Water in small portions and a perfect emulsion which remains uniform.

*Prescription No 9*

℞		
Yellow Mercurous Iodide	grains	1v
Fowler's Solution	drachms	11
Water to make	ounces	1v

If this is dispensed as written, there is precipitation of the Mercurous Iodide which is insoluble, and the agonizing uncertainty of dosage. It is replaced by the Mercurous Iodide Red Mercuric Iodide and with the addition of two drachms of Solution of Potassium Iodide (Saturated), a clear solution results in which there is no precipitation, and no uncertainty of dosage for the patient.

*Prescription No 10*

℞		
Zinc Stearate		10 0
Zinc Oxide		10 0
Calamine		5 0
Lime Water to make		120 0



The Zinc Stearate will not mix with the Lime Water. This can be overcome by the addition of Glycerin to bring the viscosity of the liquid up to the point where the Zinc Stearate will be held in suspension.

*Prescription No 11*

R <sub>x</sub>		
Zinc Sulph	grain	i
Sod Borate	grains	v
Boric Acid	grains	v
Water	ounce	i

Here we have the age-old incompatibility of Zinc Sulphate and Sodium Borate with the formation of Zinc Borate. The solution of this problem involves the addition of Glycerin to form the soluble Glycero-Borate and a perfectly clear solution results.

*Prescription No 12*

R <sub>x</sub>		
Phenolphthalein	grains	x
Acid Sod Oleate	grains	xxx
Acid Salicylic	grains	xiv
Menthol	grains	xxx

In the first instance the Menthol, Salicylic Acid and Phenolphthalein were triturated together and when the Acid Sod Oleate was added a nearly liquid mass resulted, necessitating the addition of enormous amounts of Althea, etc. In the proper manner the Menthol was rubbed up with some milk sugar, and then the other ingredients were added, the Sod Oleate being added last. Also a small amount of Althea was added thus making a nice plastic mass from which a suitable pill can be made. The pill made by the first method is about three times the size of that made by the second method. This is a distinct disadvantage, as it is always desirable to have a pill as small as possible.

*Prescription No 13*

R <sub>x</sub>		
Liquor Burowi		8 0
Naftalan		8 0
Zinc Oxid		20 0
Talc		20 0
Ol Oliv		100 0
Mix the above well and add Lime Water		

In the above, if it be compounded as written, separation will surely take place. We may, if we wish, add magnesium carbonate, but since the Naftalan is in the form of an ointment there would not be enough absorption of the water. Once again, the addition of a small quantity of tragacanth solves the difficulty and gives us the smooth homogeneous product we are looking for.

*Prescription No 14*

R <sub>x</sub>		
Adrenalin	drachm	ss
Sol Neo Sifvol 20%	drachm	i
Menthol Albolene to make	ounce	i

Here we have a separation of oily and aqueous mixtures, which can very readily be overcome by the addition of half a drachm of anhydrous lanolin to make a uniform product

#### IODINE IN LIQUID PETROLATUM

Recently, an interesting problem was brought to my attention—"How can we dissolve inorganic Iodine in Mineral Oil, and in vegetable oil where there is no great absorption by the oil?"

##### *Prescription No 15*

℞		
Iodine	grains	iii
Liq Petrol to make	ounce	i

According to F W Stedem, a pharmacist of Narberth, Pa, this prescription can be easily put up by triturating the Iodine in a glass mortar, with two thirds of the oil until as much as possible has been dissolved and then washing the rest into a bottle with the remaining Mineral Oil and holding the container under a stream of hot water for from two to five minutes. However, upon analysis, this product was shown to have only 1.77 grains of Iodine in the finished product.

An Ether Method, which was tried as part of the experimental work, is as follows. Dissolve the Iodine in a little Ether and add the Oil. Thus, on analysis, shows only 1.66 grains of the Iodine to the fluidounce.

Still another method was the process of triturating the Iodine with the Mineral Oil and allowing the mixture to stand for a time. This, on analysis, has also been found to be low in Iodine, assaying only 2.501 grains of Iodine to the fluidounce.

In my opinion, the best way to put up this preparation is to add to the Iodine, in a glass mortar, ten minims of a saturated solution of Potassium Iodide, picking this up with ten grains of Aquaphor and finally adding the Mineral Oil. In this way I believe, loss of Iodine is avoided, and the therapeutic value of the preparation is in no way affected.

##### *Prescription No 16*

℞		
Digitalis Suppositories in Glycerinated Gelatin Base		
Gelatin		100 0
Glycerin		100 0
Water to make		200 0
Suppositories No. xii		
Pulv Digitalis Allen's or Squibb's Standardized	1½ grains to each 2 Gm	

Allow the Gelatin to remain in water for one hour and then decant the water. Add the Glycerin and heat on a water-bath until dissolved. Strain and continue the heating until the product weighs 200.0 Gm. Rub the Digitalis with the Glycerin to make a paste and add to the glycerinated gelatin, while the latter is still in the liquid state. Pour into a suppository mold and allow to cool.

#### AMPULS

Frequently the pharmacist will be called on to make up some special strength of ampul. In my opinion it is inadvisable for the pharmacist to attempt to make any ampuls but those which cannot be obtained from the manufacturer, as he can

never hope to compete with the manufacturer in releasing large quantities of standard strength ampuls. Again, in making up small quantities of ampuls of some special formula, the pharmacist makes a very strong appeal to the physician.

In putting up such ampuls, instead of using a burette, it will be found very simple and convenient to use a sterile hypo syringe. The solution to be put in ampuls should be prepared in a sterile bottle with a rubber cork, through which the needle may be passed.

Some time ago, I was asked whether it is possible or profitable for a prescription shop to put up ampuls of a special formula. My answer was "Yes" to both queries.

I am glad to say that I am able to show you here, the essential points of ampul filling, and, barring the sterilization process, how little time and effort are really necessary.

Of course, care should be taken that no inferior glass be used, but only the very best.

---

## THE ACCURACY OF MEDICINE DROPPERS WITH FLARED TIPS<sup>1</sup>

BY WILLIAM J. HUSA<sup>2</sup> AND LYDIA M. HUSA

The so-called "eye pipettes," which are medicine droppers with flared tips, are commonly used for dropping liquids into the eyes, the flared tip serving to protect the eyes from injury. For the use of pharmacists in dispensing liquids which are to be dropped into the eyes, there are available the "dropping outfits" consisting of a bottle and a dropper packed together in a cardboard box, and the "eye drops bottles" in which the dropper is contained in the bottle when not in use, the bulb of the dropper serving as a stopper for the bottle.

It has been observed that pharmacists also frequently use these containers and droppers for dispensing liquid medicaments for internal use when the dose is prescribed in drops. In one case the following prescription was dispensed in an "eye drops bottle":

$\mathcal{R}_j$   
Sol Atropine Sulph. 1-1000 8  
Sig gttss in q 3 h as necessary for nausea

The medicine was administered to a child as prescribed, measuring the drops from the dropper with flared tip supplied by the pharmacist. The result was that the child showed symptoms suggesting a slight overdose of atropine sulphate. While no permanent harmful results followed in the case cited, it was thought that possibly the dropper with flared tip delivered somewhat larger drops than the physician intended.

It is well known that the size of drops is variable, being influenced by a number of factors including the surface tension of the liquid, the kind of tip on the dropper, the rate of dropping, the temperature, etc. Various attempts have been made from

---

<sup>1</sup> Presented before the Section on Practical Pharmacy and Dispensing, A. P. H. A., Madison, Wisconsin, 1933.

<sup>2</sup> Head Professor of Pharmacy, University of Florida.

time to time to standardize the size of drops of the various classes of liquids. Thus the International Pharmaceutical Conference at Brussels in 1902 recommended that the pharmacopœias of the world adopt a normal dropper with an external diameter at the tip of 3 mm and which at 15° C would deliver distilled water in drops of such size that 20 drops would weigh 1 Gm. Wimmer and Roon (1) reported measurements made with such a standard dropper. It delivered 20 drops to the Gm of distilled water, 65.5 drops to the Gm of alcohol and 90.0 drops per Gm of ether. Scoville (2) recalculated the results of Wimmer and Roon on a different basis, thus showing that the number of drops per minim was 1.36 for distilled water and 3.10 for alcohol. Stated in another way, this means that for drops delivered by the Brussels dropper, each drop of water is equivalent to about 0.74 minim.

In the present study a test was made to determine the volume in minims of the drops delivered by a number of medicine droppers with flared tips. Of 7 droppers tested, using water, 3 delivered drops equal to 1.0 minim, 3 gave drops equal to 1.1 minim and 1 gave drops equal to 1.2 minims. A nasal dropper was found to deliver drops equal to 1.0 minim. The external diameter of the flared tips varied from 4 to 5 mm, as compared with 3 mm recommended by the Brussels conference.

From these results it is apparent that the medicine droppers with flared tips delivered drops from 35% to 60% larger than recommended by the Brussels conference. This fact should be taken into account by pharmacists at the prescription counter. In doubtful cases it would be well for the pharmacist to check the size of the drops by dropping 10 or 20 drops into a graduate to determine the volume of a drop in terms of minims. From this determination, and by ascertaining the exact dosage intended by the physician, a correct dosage in drops can be specified which will hold good for the particular medicine prescribed and for the particular dropper to be used.

#### REFERENCES

- (1) Wimmer and Roon, *Jour. A. Ph. A.*, 2 (1913) 1035-1037
- (2) Scoville, 'The Art of Compounding', 5th Edition, pages 13-14

GAINESVILLE, FLA.

#### SODIUM TETRATHIONATE AND METHYLENE BLUE IN CYANIDE AND CARBON MONOXIDE POISONING

Of the various antidotes advocated to treat cyanide poisoning two according to laboratory results, are quite effective. A dose of three to four milligrams of a hydrocyanic acid solution per kilogram of body weight is fatal for the rabbit when administered orally. The intravenous injection of two to three milliliters of a 2 per cent solution of sodium tetrathionate per kilogram of body weight is effective in saving rabbits having received orally three times the minimal lethal dose of hydrocyanic acid (10 milligrams per kilogram

of body weight). The sodium tetrathionate solution is administered with the onset of the first symptoms of cyanide poisoning. Rabbits tolerate three times the above therapeutic quantity of tetrathionate without exhibiting any toxic effects.

Methylene blue administered intravenously in the form of a 1 per cent aqueous solution does not afford quite as much protection. Rabbits receiving more than two times the minimal lethal dose (more than six or seven milligrams of hydrocyanic acid per kilogram of body weight) could not be saved. The intravenous injection of quantities in excess of 2.5 of a 1 per cent solution of methylene blue was injurious to the rabbit.—From *Science*

# THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS  
DEPARTMENT

## SUMMARY OF THE PROCEEDINGS OF THE 1933 MEETING OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

The thirty-fourth annual meeting of the American Association of Colleges of Pharmacy was held at the Loraine Hotel, August 28 and 29 1933. One hundred and nine delegates from 48 member-colleges were in attendance. At least five non member colleges had staff members in attendance.

Following the calling of the roll of member colleges, a memorial to Professor Suppan was presented by Dean Caspari, and Secretary Cooper read one prepared by Dr. L. E. Warren on the life of Dr. W. A. Puckner.

Before proceeding to business, the Association voted to send greetings to Dean C. W. Johnson who had been taken suddenly ill on his way to the convention and removed to a hospital at Minot, North Dakota.

A resolution relative to the code for pharmacists had been considered by the Executive Committee and was presented by Dean Jordan and adopted by the Association.

WHEREAS It has been suggested that registered pharmacists, registered assistant pharmacists and apprentice pharmacists be removed from the professional status in the code regulating retail pharmacy be it

*Resolved*, That the American Association of Colleges of Pharmacy, representing 57 colleges in convention assembled protest this removal and insist that registered pharmacists, registered assistant pharmacists and apprentice pharmacists retain their professional status as in the original code."

### ADDRESS OF THE PRESIDENT <sup>1</sup>

President Stocking directed attention to some of the Association's achievements in the past, particularly to the significance of the year 1932-1933 in which all member-colleges had a minimum four year curriculum. The important task for the immediate future is that each member-college should endeavor to perfect its curriculum.

He pointed out the value of the Association's visitation program, and that the American Council on Pharmaceutical Education with representatives from the three allied associations will soon begin to function.

His recommendations were referred to the Committee on Resolutions.

### REPORT OF THE SECRETARY-TREASURER

The secretary-treasurer reported a membership of 57 colleges with two in arrears for dues. During the year, 16 member-colleges were visited by representatives of the Association. In the three-year period just closed the second series of visits was nearly completed. Fifty-two colleges have been visited at an average expense of \$33.76.

The status of Association funds is as follows: cash \$382.76, government bonds \$5000. Funds in closed banks amount to \$9193.21. A total of \$1112.41 in dividends was paid during the year and one of the banks has announced another payment for September.

The report was accepted and a committee appointed to audit the accounts, which committee reported later that they were found to be correct.

---

<sup>1</sup> For complete address see September JOURNAL.

## REPORT OF THE EXECUTIVE COMMITTEE

Dean Jordan chairman of the Executive Committee, submitted the following summary of reports of preliminary training of entering students

Total number entering	1780
Number of high school graduates	1773
Number of special students	7
Number with previous college training	418

Analysis of the figures shows that the number is not abnormally low for last year. One of the larger colleges did not report and one had a reduction of 92 per cent due to requiring a year of collegiate training for entrance. Correcting for these causes the decrease was 23 per cent, but a few colleges had had an unprecedented number in the preceding year because it was the last time a student could enter upon a three-year course. Of the colleges that went to a four year minimum prior to September 1932, eight enrolled fewer students, four a greater number and two the same number. The percentage having previous college training was 23, a larger figure than before.

The total number of Ph G, Ph C and B S degrees awarded to graduates of three and four-year courses was 1684. Excluding duplicates and including the number who received some other degree 1694 people were graduated. Advanced degrees were awarded to 53, 41 Master of Science, 11 Doctor of Philosophy.

The second series of visits to member colleges was continued, the following visits being made: Universities of North Carolina, South Carolina and Florida, the Medical College of the State of South Carolina and Louisville College of Pharmacy visited by President Stocking, South Dakota State College, North Dakota State College and the St. Louis College of Pharmacy visited by Dean Lyman, Universities of Idaho, Washington, Montana, Southern California and Tulane North Pacific College of Oregon, Oregon Agricultural College and State College of Washington by Dean Jordan. The University of Minnesota and Meharry Medical College will be visited early in the year 1933-1934, and these will complete the second series.

The report contained two recommendations and a supplemental report made at the final session contained two, one of which had been referred from the report of the representative on the American Council on Pharmaceutical Education. All of these recommendations were adopted.

(1) "That the American Association of Colleges of Pharmacy expresses the desire of pharmaceutical educators to cooperate with educators in other health professions and that our Association stands ready to appoint a committee to meet with similar committees from medicine, dentistry and nursing for the purpose of accomplishing this cooperation (correlation of education in all health professions), and further

That a copy of this resolution be sent to the national educational association of the other health professions

(2) 'That a standing committee on libraries be created

(3) "That the Association contribute \$300.00 to the budget of the American Council on Pharmaceutical Education

(4) "That the Association discontinue visitation of member colleges until we can determine how successfully the American Council on Pharmaceutical Education will function."

Dean Jordan presented a resolution which had been adopted by the National Association of Boards of Pharmacy which proposed that the Association of Colleges accept the list of crude drugs prepared by District No. 2 as a minimum list. It was voted that a committee be appointed to study the matter and report at the next annual meeting.

## REPORT OF THE SYLLABUS COMMITTEE

Dean Beard directed attention to important steps in the procedure of revision of the Syllabus, set forth its aims and purposes and urged that the book be given official status.

## REPORT OF THE COMMITTEE ON MEMBERSHIP STANDARDS

Dean Little presented the report of the Committee and almost an entire session was taken up in discussion and revision of the provisions. It was adopted and a copy of the proposed standards is being sent herewith in accordance with Article VIII, Section 7 of the By Laws.

REPORT OF THE COMMITTEE TO CONFER WITH THE EXECUTIVE COUNCIL OF THE ASSOCIATION OF  
AMERICAN MEDICAL COLLEGES

Dean Jordan, chairman of this Committee, reported that misunderstandings had been cleared up and now all professional colleges will be treated alike in the matter of their credits. The Executive Council of the Association of American Medical Colleges took the following action November 14, 1932

"Premedical courses given in or by professional schools, or advance years taken in high schools will not be considered as acceptable unless the student's credentials have been accepted by an accredited college of arts and science as meeting a part of its requirements for the bachelor's degree."

COMMITTEE REPORTS THAT INCLUDED RECOMMENDATIONS

The report of the Committee on Establishment of a Pharmaceutical Corps in the United States Army and the report of the Committee on Relations of Boards and Colleges were referred to the Committee on Resolutions and the recommendations will be found under that heading

REPORT OF THE REPRESENTATIVE ON THE COUNCIL ON PHARMACEUTICAL EDUCATION

This report was submitted by Dean DuMez who was made secretary of the Council when organization was completed. It had been agreed "that the setting up of standards for schools of pharmacy should be the first work of the Council and that the standards suggested by Dean Leigh in his presidential address be used as the basis for beginning the work." It had been necessary to defer the actual beginning but the secretary has been "assembling data and perfecting plans for going ahead with the work" and it has been decided to go forward immediately. The report recommended that \$300, our proportionate share, be contributed to the budget.

The report was accepted and the recommendation referred to the Executive Committee.

REPORT OF THE COMMITTEE ON HIGHER EDUCATIONAL STANDARDS

The report which was presented by Dr. Husa contained several recommendations, it was accepted and the recommendations referred to the Committee on Resolutions.

OTHER COMMITTEE REPORTS

The following reports of standing committees, which contained no recommendations were accepted: Committee on Curriculum and Teaching Methods, Committee on Activities of Students and Alumni Delegates to the American Council on Education.

Reports of special committees and special representatives, that were without recommendations, were accepted as follows: Committee on Student Branches of the A. P. H. A., Representatives to the National Drug Trade Conference, Representative to the N. A. R. D., Representatives to the National Conference on Pharmaceutical Research, Representative to the Annual Congress on Medical Education and the Reporter on Biological Abstracts.

The work of the Committee on the Study of Pharmacy having been taken over by the Council on Pharmaceutical Education it was voted that it be discontinued.

Dr. Crockett reported that the Drug Trade Bureau of Public Information had ceased to function so a representative will no longer be appointed.

At Dean Caspari's suggestion representation on the Drug Store Survey Committee will be discontinued.

Dean Day's report as representative on the Committee on Centennial Celebration was accepted. The Executive Committee, having given consideration to the need for funds, recommended that the Association give \$50 to the Century of Progress Exposition. It was so voted.

REPORT OF THE HISTORIAN

Dean Kremers submitted an outline of what he hopes to embody in "A History of Pharmaceutical Education in the United States." So far he has written an introduction and part of the "General Survey." In 1931 the first period, early beginnings, 1821 to 1861 was presented, in 1932, the second period the first conference, 1870 to 1879, and this year 1933, third period, covering the advent of the state university department, 1880 to 1899 has been prepared. The

fourth period which he expects to take up now will cover the second conference, 1900 on The outlined plan contemplates consideration later of special phases of pharmaceutical education and for this he asked the cooperation of all who have suggestions or material

#### ADDRESSES

The guest speaker at the annual dinner was Dr. Karl Link, professor of biochemistry in the department of agricultural chemistry at the University of Wisconsin, who spoke on "The Role of Science in Modern Education"

At one of the sessions, Dr. Fred Zapffe, secretary of the Association of American Medical Colleges, discussed some educational problems of common interest to medicine and pharmacy

#### REPORT OF THE COMMITTEE ON RESOLUTIONS

The Committee on Resolutions, consisting of Dean Spease, Chairman, Dean Teeters, Dean Curry and Professor Lee submitted the following report

'WHEREAS, the President of the Association has submitted such an admirable report and has served us so faithfully we wish to offer a resolution that he be thanked by the Association for his good work

The resolution was adopted

From the President's Address

I feel that it would be but a meager tribute on our part if we were to adopt a resolution extending to Dr. Krcmers, the Director of the Course in Pharmacy of the University of Wisconsin and to his staff our heartiest congratulations on the remarkable record of the first half century of the institution, and expressing our faith and confidence in the future developments of pharmaceutical education in Wisconsin as exemplified by the results of the last fifty years"

'The Fourth Edition of the Pharmaceutical Syllabus which has come from the press since our last meeting is a credit to the Committee that directed the work of preparing it and especially to Dean J. G. Beard the Chairman of the Committee. This Association as a contributing member of the joint Committee should express to Dean Beard its deep appreciation for the untiring effort which he put forth to bring to completion in such a satisfactory manner the work of preparing and publishing the Syllabus'

Both recommendations were adopted

From the Report of the Committee on the Establishment of a Pharmaceutical Corps in the United States Army

"That the Association continue its effort to secure the proper recognition of pharmacy in the United States Army and Navy

That the Association go on record for the recognition of pharmacy on a parity with the Dental, the Veterinary and the Medical Administrative Corps within the Medical Department of the United States Army, and that this be one of the major objectives of the Association for the ensuing year

That the Committee be continued and instructed to secure, if possible, a hearing before the Secretary of War, the Surgeon General of the Army, and the Military Affairs Committee of the Senate and the House

"That all the leading pharmaceutical organizations of America including the State Pharmaceutical Associations, be requested to appoint special committees on the establishment of pharmacy properly in the United States Army all to work together for this good purpose"

All four recommendations were adopted

From the Report of the Committee on Higher Educational Standards

It is recommended that the name of the 'Committee on Higher Educational Standards' be changed to the 'Committee on Educational Standards'

It is recommended that the fourth sentence of Article VII By-Law 6, be amended to read as follows: 'Graduate work shall be interpreted to mean work done after the completion of the requirements of a standard four-year course in pharmacy'

Both the above recommendations were adopted

The third recommendation which had to do with qualifications for deans of colleges of pharmacy was reported back to the Association for discussion and it was finally referred to the Executive Committee for study and report at the next annual meeting



From the Report of the Committee on Relation of Boards and Colleges

'That this Conference (District No 2) for the sake of uniformity and definite meaning urge all colleges of pharmacy to adopt in their catalogs and annual announcements the descriptive names and subjects used in the National Pharmaceutical Syllabus for corresponding courses "

This recommendation was adopted and the report of the Committee on Resolutions as a whole was adopted

#### PAPERS

At the close of the first business session, the Association went to the Museum of the Wisconsin Historical Society Dr Schafer welcomed the visitors and Dean Kremers, with illustrative material close at hand, read a paper entitled "Introductory Lecture to a Course in History of Pharmacy "

At one of the sessions two papers dealing with library work were presented 'Use of the Library in Undergraduate Instruction ' by Dr Lee and "A Demonstration of Library Work ' by Dr Richtmann

#### NEW MEMBER-COLLEGE

Xavier University College of Pharmacy, New Orleans Louisiana, was elected to membership

#### RESIGNATION OF A MEMBER COLLEGE

The resignation of the University of California, California College of Pharmacy, San Francisco was accepted

#### OFFICERS FOR 1933-1934

*President* Dean L D Havenhull, Lawrence, Kansas

*Vice President* Dean Ernest Little Newark, New Jersey

*Secretary Treasurer* Professor Zada M Cooper, Iowa City, Iowa

*Chairman of Executive Committee* Dean Charles B Jordan, Lafayette Indiana

*Members of Executive Committee to serve two years* Professor Charles H Stocking, Ann Arbor, Michigan Dean Rufus A Lyman Lincoln Nebraska

*Members of Executive Committee whose terms expire this year* Dean Andrew G DuMez, Baltimore, Maryland, Dean Townes R Leigh Gainesville, Florida

*Member of the Syllabus Committee* Dean Elmer L Hammond Oxford, Mississippi

#### JOINT SESSION

At the joint session with the National Association of Boards of Pharmacy, Editor Eberle presented the report of the Fairchild Scholarship Committee The scholarship was awarded to Miles Edward Drake who received the degree of B S in Pharmacy at Oregon State College in June 1933

Dean Jordan presented a paper 'Is Compulsory Apprenticeship Registration Working a Hardship on Young Men Entering Pharmacy?' The paper was discussed by Mr Sterling

Professor Schlichting presented some resolutions that had been referred from the meeting of boards and colleges in District No 2 The resolutions were all approved

#### CONFERENCE OF TEACHERS OF PHARMACY

Dr Louis W Rising Chairman presided and the following program of papers was presented

"The Necessity for Increasing Emphasis on the N F in Pharmacy Courses," W J Husa

"Shall Pharmacy Colleges Teach Dental Pharmacy " G C Schicks

'When Should the Course in Incompatibilities Begin and How Should It Be Taught?'

H W Mantz

"The Teaching of Incompatibilities," W G Crockett

Prescription Incompatibilities and Their Problems from the Teaching Standpoint ' R E Terry

'How Should a Course in Incompatibilities Be Taught and How Much Time Should Be Devoted to It?' D B R Johnson

Officers elected for the ensuing year were as follows *Chairman*, F V Lofgren, *Secretary*, E D Davy, *Secretary*, W G Crockett

#### CONFERENCE OF TEACHERS OF CHEMISTRY

The Conference was called to order by the Chairman, Dr Foote The following program was carried out

"What the Department of Pharmacy Expects of the Department of Chemistry," H C. Newton

Why Organic Chemistry Should Be Taught in the School of Pharmacy," C J Klemme.

"The Inter-Relation of the Department of Pharmacognosy-Pharmacology and Chemistry," B V Christensen (Presented also to Conference of Teachers of Pharmacognosy and Pharmacology)

Officers elected for the ensuing year were *Chairman*, H C Muldoon, *Secretary*, M L Jacobs

#### CONFERENCE OF TEACHERS OF PHARMACOGNOSY AND PHARMACOLOGY

Chairman B V Christensen presided and the following program of papers was presented

"Four Years' Experience in Teaching Pharmacology," E R Series

"Visual Instruction in Pharmacognosy," F H Eby

"Microscopical Pharmacognosy," E P Claus

"Shall the Relationship of Botany to Pharmacognosy Be Maintained?" C W Ballard

The New Syllabus Outline of Pharmacology was discussed

Officers chosen for the ensuing year were *Chairman*, C W Ballard, *Secretary* A J Schwarz

#### CONFERENCE OF TEACHERS OF PHARMACEUTICAL ECONOMICS

Dr Philip, *Chairman*, presided The program consisted of a discussion of the National Industrial Recovery Act and the code as applied to the drug store

The following officers were selected for the ensuing year *Chairman*, F J Amrhein, *Secretary*, Paul C Olsen

ZADA M COOPER, *Secretary*

Approved CHARLES B JORDAN, *Chairman Executive Committee*

#### INDIANA PHARMACEUTICAL ASSOCIATION EXHIBIT

The Indiana Pharmaceutical Association had an exhibit at the State Fair along with the Medical Society and the Associations of the Dentists and Nurses The committee in charge of making the display consisted of Dean Edward H Niles H J Borst and Joe Wade, all of Indianapolis The display consisted of prescription utensils and crude drugs loaned the committee by the Indianapolis College of Pharmacy and Eli Lilly & Company with explanation cards and displays In a ten-foot show case in the front was a selection of crude drugs, laboratory equipment and a very attractive display of gelatin and eight different colors of empty capsules including the large veterinary capsules On top of the case were pictures and samples showing steps in the making of pills A large percolator was

operating showing the process of manufacturing aromatic cascara Ma Huang products and pictures showing the manufacture, attracted attention, along with other crude drugs

#### MEDICINE AND PHARMACY

I am of the opinion that never before in the history of medicine and pharmacy in the United States have there been better conditions for close cooperation than there are to-day Both medicine and pharmacy are rapidly advancing both are fundamentally sound and each deserves the confidence of the other In fact, a close cooperation of the two professions will be mutually beneficial and will contribute to the public health of the nation —C. B Jordan, Dean School of Pharmacy, Purdue University, in *Med Economics*

## THE PROFESSIONAL PHARMACY \*

BY FRANK A DELGADO AND ARTHUR A KIMBALL, U S DEPARTMENT OF COMMERCE

*(Continued from page 901)*

## CHAPTER VII STUDY OF LEADING INGREDIENTS

A total of 20,000 prescriptions 10,000 from professional pharmacies and 10,000 from commercial type drug stores, were carefully studied and a compilation of all ingredients occurring therein was made. A list was made of all ingredients, classified according to type, showing the number of times that each ingredient occurred. Space does not permit the inclusion of the entire list, but all "leading" ingredients, those occurring five times or more each in 10 000 prescriptions are listed in this report with the exception of manufacturers' brand named specialties, which cannot be published under the policy of the Department of Commerce. However, a complete summary of the leading manufacturers' specialties according to their therapeutic use and action is included. It is worth while to refer to "The Prescription Ingredient Survey," written by Prof E N Gathercoal and published by the AMERICAN PHARMACEUTICAL ASSOCIATION which lists the leading manufacturers' specialties and other ingredients.

In the first prescription department report on the Survey, all ingredients occurring 25 times or more each in 15 063 prescriptions filled in commercial type drug stores were considered leading ingredients and listed as such. Inasmuch as some might consider the list of ingredients occurring 25 times or more not sufficiently inclusive, it was decided to use all ingredients occurring 5 times or more in this second report. This minimum number of occurrences, only 5 times in 10 000 prescriptions, might be considered too small to enable an ingredient to be classed as a "leading" ingredient, but when it is considered that only 684 out of the 1725 different ingredients occurred as many as 5 times, it will be seen that the number of leading ingredients is small compared with the number of prescription items carried by the usual drug store.

It is realized that the accompanying lists of leading ingredients omit some items which some pharmacists may consider important and include other items which might be considered unimportant, according to the experience and requirements of some members of the profession. However, it should be kept in mind that the ingredients listed are those which actually occurred in the 20,000 prescriptions studied. Syrup of ginger for example occurred 160 times and has a high place in the list. This was brought about by the unusual preference of one doctor for this vehicle, this doctor writing a substantial number of the prescriptions studied in one store. It is not likely that syrup of ginger would ordinarily receive such a high place on a list of leading ingredients. Due to manufacturing within the pharmacies and the fact that these lists contain only ingredients prescribed as such, some important items do not have a place in these lists. For example, citric acid does not even appear in the list. Yet Store 6-B purchased and used an average of 7 pounds (worth \$3 18) a month over a six months' period. Another example is fluidextract of wild cherry which was extensively used in the drug stores in manufacturing syrup of wild cherry, and yet not being prescribed in the fluidextract form, does not appear among the leading ingredients. A number of galenicals, such as waters, syrups, simple percentage solutions etc are in all probability manufactured more economically by the pharmacist. However not all of the ingredients used in their preparation appeared in the prescriptions studied.

Among other items usually stocked in the prescription department which may not be found at all or only to a limited extent in these or any other lists based on ingredients occurring in prescriptions are the following: Spirits (oil) of turpentine, castor oil, acid muriatic acid oxalic calcium oxide (lime for lime water) carbon tetrachloride, prepared chalk (technical) sodium fluoride, flaxseed whole and ground, powdered ornith root solution of formaldehyde, denatured and wood alcohol, benzine, caramel, honey chloride of lime, Paris green plaster of Paris, powdered pumice whiting ether (anesthesia), ether (motor) soap liniment, tincture of arnica, fluidextract of rose soluble fluidextract of sarsaparilla fluidextract of tolu, fluidextract of wild cherry, pills cathartic compound improved dispensary tablets, potassium bicarbonate potassium permanga-

\* See Table of Contents page 671, July issue of the JOURNAL—This instalment concludes the article which will be made up in paper covered reprints for price see August JOURNAL page 799

nate, saccharine, extract of lemon extract of vanilla tablets veronal, hypodermic tablets of strychnine sulphate capsules of apiol and ergotine compound, capsules of quinine sulphate and bisulphate, santal oil, blue ointment, carbolic (phenol) ointment, compound licorice powder, ampuls corpus luteum, ampuls ovarian substance, oil of cotton seed, neatfoot oil, oil of cedar oil of citronella and oil of cloves Biologicals and insulin are two other outstanding types of prescription department items which may have important sales in many drug stores, and yet fail to appear on a list of the leading ingredients prescribed

To a certain extent every drug store presents an individual problem predicated upon the prescribing habits of its contributing physicians, geographical location health and weather conditions etc., thus making it impossible to evolve a single formula establishing the correct stock of drugs for all drug stores But with a few additions and deletions the accompanying lists should serve as an excellent guide to the pharmacist confronted with the problem of placing his opening order for a prescription department stock, and to the wholesaler in supplying the requirements of retailers

For purposes of convenience, the leading ingredients have been classified into the following four types 1 Chemicals, 2 Galenicals and pharmaceuticals, 3 Botanicals oils, etc., and 4 Proprietarys or manufacturers specialties (shown by therapeutic use only) The number of items in each group, together with a suggested quantity and the prevailing cost price at the time of the Survey, are shown A number of items listed under chemicals might not be so classified if the full scientific significance of the term was applied Such items have been classified as chemicals for convenience and other practical purposes, due among other reasons to the fact that they are usually placed on the drug store shelves along with chemicals and are frequently distributed by chemical manufacturers In the same manner, a few items classified under galenicals and botanical drugs do not strictly fit under these descriptions Examples of these are lanolin and petrolatum which were placed along with ointment bases as they are usually placed on the prescription department shelves

In the majority of instances the official English titles have been employed However a few exceptions will be noted, due to a desire to group certain chemicals and pharmaceuticals together in certain classes For example, all of the salts of iron and mercury are grouped together

Table XXXVII gives a summary of the leading ingredients, those prescribed at least five times each It will be seen that chemicals had the most prominent place among the leading ingredients The 164 chemicals represented only 24 per cent of the 684 leading ingredients in numbers but were prescribed an average of 135 times each, or a total of 22,087 times Galenicals, which had the next best showing, were prescribed an average of only 49 times each Chemicals were actually called for on prescriptions more times than the combined total for the other three groups of leading ingredients

It is particularly interesting to note that for the comparatively small sum of \$93 51, all of the 164 leading chemicals could be stocked by the pharmacist, the average cost of a typical order being only \$0 57 per chemical On the other hand a typical order of each of the 253 specialties occurring among the leading ingredients would cost a total of \$288 98 or an average of \$1 14 per specialty Thus it is seen that the low average investment required in the case of chemicals, and their fine movement rate both of which factors are an indication of low operating cost, give chemicals a distinct advantage from the point of view of profit possibilities to the pharmacist The entire 684 leading ingredients could be stocked for an investment of \$605 77 according to cost prices at the time of the Survey With a few exceptions, to account for a store's individual and peculiar customer demands and to provide items of an emergency nature, these 684 items ought to comprise a sufficient opening order for the prescription department of a usual commercial type drug store, and should form the basis for the opening order for a professional pharmacy In fact some stores would probably find the entire 684 items to be too large an opening order Pharmacists wishing to be very conservative until the demand is proved might order at the start only those items which occurred at least 10 times each which would probably comprise an adequate opening order for the prescription department of the average commercial type pharmacy If only the 445 items which occurred 10 times or more each in 10,000 prescriptions were ordered, the investment required would amount to only \$387 The opening order would then be composed of 126 chemicals valued at \$74 88 151 galenicals costing \$132 07, 147 specialties valued at \$168 17 and 21 botanicals, oils etc. valued at \$11 88, plus necessary

emergency items Necessary additions to the stock could later be made when actually received on prescriptions to be filled This procedure will help to avoid overstocking on the opening of a new store

The cost prices shown in the table and lists are based on the best chemicals and other types of ingredients Even thus, the 684 leading ingredients could be purchased for only a little more than \$600 This fact should convince the pharmacist opening a new drug store of the advisability of stocking only the best chemicals and other ingredients, as any difference in price based on quality would be of little importance when considered in terms of the individual prescription

Realizing the immense practical value of any information on the subject of the cost of stocking a prescription department the authors contacted a leading manufacturer of fine prescription chemicals This manufacturer offers pharmacists their choice of three assorted lots of chemicals one containing 102 items and costing approximately \$50 one containing 153 items and costing approximately \$75, and the other consisting of 253 items and costing approximately \$125 Upon checking the survey list against the manufacturer's lists it was found that only 25 per cent of the items on the manufacturer's smallest list and 43 per cent of his largest list did not occur on the Survey list This difference would have been far less if the manufacturer's lists had included narcotics as does the Survey list and if the manufacturer's lists had not included quite a few specialties galenicals balsams oils etc in addition to chemicals The average cost per item on the manufacturer's lists was \$0.50, as compared with an average cost of \$0.57 for the leading chemicals in the Survey This difference is easily accounted for by the fact that the Survey list included a number of narcotics with an average cost of approximately \$1.70 In fact the 11 narcotics among the 164 leading chemicals would cost about \$19 and represent nearly 20 per cent of the investment required in stocking the 164 chemicals Yet in spite of the inclusion of these comparatively expensive narcotic items the 164 chemicals would require an investment of only \$93.51

The quantities shown on the lists are considered the most economical for the average store to purchase, being neither too large nor too small In the case of chemicals the quantities should be sufficient to take care of the requirements of the average store for a considerable period of time In the case of certain items such as acid acetylsalicylic (aspirin) a pound at \$1.05 rather than a quarter pound at \$0.31 might advantageously be ordered, but when it is considered that the saving on this item would only be \$0.05 a quarter pound, it is not believed that the valuable and limited space required to shelve the larger package would be warranted

Conversely there are a few instances where the reader may feel that the quantities mentioned are too large Here again it is largely a case of individual opinion For example acid benzoic was prescribed an average of only three times in each of five stores studied, yet 4 oz at \$0.27 rather than 1 oz at \$0.18 is suggested One reason for this is the decided price differential and another that the 1 oz packages are almost too small to allow of easy handling In using the list it should be borne in mind that a number of items such as boric acid, are increased in quantity due to the fact that two forms such as powdered and crystal are necessary There are also a few chemicals which should be stocked in two or even three sizes, and a very few instances where one or two extra packages are desirable to meet the demands of the occasional 'over the counter' call for an unbroken package Only one pound of certain chemicals, such as magnesium sulphate (Epsom Salt) is designated, the primary purpose of the list being to show the quantity necessary to meet prescription demands Naturally a much larger quantity of this and other chemicals used for other purposes would have to be stocked put up in convenient packages or in 5-lb to 100 lb lots In allocating quantities the factors of possible deterioration potency and extent of use have been kept in mind

It will be seen that the list of 164 leading chemicals contains a number of alkaloids, such as cinchonidine cinchonine cocaine codeine ephedrine eserine morphine and strychnine Most of these alkaloids with the exception of cocaine and ephedrine used in oil solutions, are very rarely used in compounding prescriptions though often prescribed

Manufacturers' price lists seldom quote prices on narcotic chemicals, galenicals and pharmaceuticals due to the tendency of the prices to fluctuate but the prices shown on the lists were obtained from reliable sources

A study was made of the 668 official prescriptions analyzed for commercial type Store 6 B

and it was found that chemicals predominated in approximately 50 per cent of them and were present in many others. As seen by consulting Tables XVI, XVII and XVIII the cost of ingredients in prescriptions containing only official ingredients was low. This average item investment of only \$0.57 for chemicals supplies a reason for that finding.

TABLE XXXVII — SUMMARY OF INGREDIENTS WHICH OCCURRED FIVE TIMES OR MORE EACH

Type of Ingredient	Number of Ingredients	Per Cent of Total	Total Value of Opening Order	Average Cost per Item	Number of Times These Ingredients Were Prescribed Per Cent of Average per		
					Total.	Total.	Ingredient
Chemicals	164	24.0	\$ 93.51	\$0.57	22,087	51.3	135
Galenicals	234	34.2	206.15	0.88	11,357	26.4	49
Specialties	253	37.0	288.98	1.14	8,625	20.0	34
Botanical Oils, etc	33	4.8	17.13	0.52	983	2.3	30
Total	684	100.0	\$605.77	\$0.89	43,052	100.0	63

The last column in each of these ingredient tables shows the average number of times each ingredient occurred in the "U S P-N F Ingredient Survey," which is described at more length later in this chapter. This Survey was conducted by Prof. E. N. Gathercoal and was based on 121,924 prescriptions in the states of New York, Maryland, Missouri and California. These prescriptions were obtained from professional pharmacies, commercial type drug stores with a good prescription business, and many commercial type stores which filled less than ten prescriptions a day. The data on prescription ingredients prepared by the National Drug Store Survey was contributed as the Missouri portion of the survey. The publication from Professor Gathercoal's survey is entitled "The Prescription Ingredient Survey," and is published by the AMERICAN PHARMACEUTICAL ASSOCIATION. It is believed that the average for these four states provides a valuable comparison with the occurrence of ingredients in the St. Louis stores forming the test stores in this report.

NOTE. Foot-note 1 in each of the lists. Items so marked are generally important throughout the country, occurring at least 10 times per 10,000 prescriptions in each of the four states represented in "The Prescription Ingredient Survey." If an item appeared in either set of 10,000 prescriptions from Missouri it qualified as to Missouri. In rare cases the foot note is applied to an item which fell slightly below the requirements or varied considerably in just one state for some unusual reason.

TABLE XXXVIII — LIST OF 164 CHEMICAL INGREDIENTS OCCURRING 5 TIMES OR MORE IN EACH 10,000 PRESCRIPTIONS FROM PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES

Rank in Group	Leading Chemicals	Source of Authority	Unit	Unit Price	Number of Occurrences per 10,000 Prescriptions.		
					St. Louis Commercial Type Drug Stores	St. Louis Professional Pharmacies	Average in Pharmacies throughout the U S
79	Acetanild <sup>1</sup>	U S P X	4 oz	\$0.17	35	6	23.2
147	Acetone	U S P X	1 lb	0.42		7	3.1
4	Acetphenetidin <sup>1 2</sup>	U S P X	4 oz	0.53	721	306	350.0
2	Acid, Acetylsalicylic <sup>1 3</sup>	U S P X	4 oz	0.31	896	343	476.2
46	Acid, Arsenous <sup>1</sup>	U S P X	1 oz	0.13	64	45	46.7
47	Acid Benzoic <sup>1</sup>	U S P X	4 oz	0.29	14	92	25.9
11	Acid, Boric <sup>1</sup> (1 lb powder, 1 lb crystal)	U S P X	2 lb	0.44	153	345	174.0
53	Acid, Hydrochloric (Dilute) <sup>1</sup>	U S P X	1 pt	0.30	31	67	53.4
140	Acid, Lactic	U S P X	4 oz	0.29	3	6	3.6
148	Acid Nitrohydrochloric (Dilute)	N F V	1 oz	0.15		7	5.1

141	Acid, Pyrogallol	U S P X	1 oz	0 31		9	0 8
18	Acid, Salicylic <sup>1</sup>	U S P X	8 oz	0 22	47	296	122 3
91	Acid Tannic <sup>1</sup>	U S P X	1 oz	0 18	17	16	20 9
149	Acid, Tartaric	U S P X	1 lb	0 54	7		0 8
43	Alcohol <sup>1</sup>	U S P X	1 gal	4 00	50	71	89 5
92	Alum <sup>1</sup> { 1 lb powder 1 lb burnt 1 lb crystal	U S P X	3 lbs	0 77	12	21	20 7
67	Aluminum Acetate <sup>4</sup>		4 oz	0 31	11	54	7 1
62	Amidopyrine <sup>1</sup>	U S P X	1 oz	0 75	45	31	135 8
86	Ammonium Bromide <sup>1</sup>	U S P X	4 oz	0 24	12	24	26 2
106	Ammonium Carbonate <sup>1</sup>	U S P X	4 oz	0 21	13	11	26 7
16	Ammonium Chloride <sup>1</sup>	U S P X	4 oz	0 13	297	120	208 4
130	Ammonium Iodide	U S P IX	1 oz	0 43	10	2	5 8
59	Antipyrine <sup>1</sup>	U S P X	1 oz	0 27	67	19	62 3
1	Aqua (Distilled) <sup>1</sup>	U S P X	5 gal	1 50	833	1144	839 5
17	Atropine Sulphate <sup>1</sup>	U S P X	1/8 oz	0 48	169	240	125 1
75	Barbital <sup>1</sup> *	U S P X	4 oz	1 30	7	45	24 9
100	Barbital Sodium	U S P X	1 oz	0 65	4	23	6 1
137	Barium Sulphate	U S P X	1 lb	0 21	1	9	3 6
154	Betanaphthol Benzoate		1 oz	0 27	6		0 7
35	Bismuth Subcarbonate <sup>1</sup>	U S P X	4 oz	0 50	97	67	104 0
131	Bismuth Subgallate <sup>1</sup>	U S P X	1 oz	0 25	6	5	17 4
24	Bismuth Subnitrate <sup>1</sup>	U S P X	4 oz	0 46	176	76	131 9
19	Caffeine <sup>1</sup>	U S P X	1 oz	0 29	214	78	73 3
9	Caffeine Citrated <sup>1</sup>	U S P X	4 oz	0 72	451	163	201 7
81	Calamine Prepared <sup>1</sup>	N F V	1 lb	0 47	23	17	46 1
127	Calcium Bromide	U S P X	1 oz	0 17	4	9	5 8
60	Calcium Carbonate Pre- cipitated <sup>1</sup>	U S P X	1 lb	0 21	39	41	33 4
111	Calcium Chloride	U S P X	4 oz	0 20	15	5	8 3
120	Calcium Gluconate		4 oz	0 35	1	13	7 1
155	Calcium Glycero- phosphate	U S P X	1 oz	0 24	5	1	7 4
82	Calcium Lactate <sup>1</sup>	U S P X	4 oz	0 29	13	27	28 4
31	Calomel <sup>1</sup>	U S P X	4 oz	0 47	110	91	81 8
29	Camphor <sup>1</sup>	U S P X	1 oz	0 15	128	89	85 0
44	Camphor Monobromate <sup>1</sup>	U S P IX	4 oz	0 70	98	23	46 2
109	Carmine	N F V	1 oz	0 51	15	8	7 0
83	Cerium Oxalate <sup>1</sup>	U S P IX	4 oz	0 20	24	13	41 6
93	Charcoal <sup>1</sup>	U S P X	4 oz	0 22	27	6	20 8
73	Chloral Hydrate <sup>1</sup>	U S P X	4 oz	0 38	37	16	44 3
102	Chloroform	U S P X	1 lb				
			and 4 oz	0 75	14	11	9 3
99	Cinchonidine		1 oz	0 95	28		
37	Cinchonidine Sulphate	U S P X	1 oz	0 62	160		13 8
132	Cinchonne	U S P X	1 oz	0 67	10	1	
98	Cinchonine Sulphate	N F V	1 oz	0 50	22	7	3 8
96	Cinchophen <sup>1</sup>	U S P X	1 oz	0 34	20	12	27 9
56	Cocaine <sup>6</sup>	U S P X	1/8 oz	1 63	33	59	2 2
30	Cocaine Hydrochloride <sup>1</sup> *	U S P X	1/8 oz	1 44	71	145	105 0
84	Cocaine Nitrate <sup>6</sup>		1/8 oz	1 55		37	3 0
133	Cocaine Sulphate <sup>6</sup>		1/8 oz	1 50	5	6	1 4
51	Codeine <sup>6</sup>	U S P X	1/8 oz	1 84	56	44	2 3
12	Codeine Phosphate <sup>1</sup> *	U S P X	1/4 oz	2 45	361	100	99 6

3	Codaine Sulphate <sup>1 6</sup>	U S P X	1/4 oz	2 69	610	433	633 7
95	Cotarnine Chloride (Stypticin) <sup>6</sup>	U S P X	1/8 oz	1 38	21	12	8 1
70	Creosote (Beechwood) <sup>1</sup>	U S P X	4 oz	0 40	45	12	14 8
116	Creosote Carbonate	U S P X	1 oz	0 26	10	6	6 7
97	Digitalin		15 gr	1 10	16	16	5 7
41	Ephedrine		1/8 oz	0 81	72	57	0 7
128	Ephedrine Hydrochloride		1/8 oz	0 70	6	7	7 0
34	Ephedrine Sulphate <sup>1</sup>		1/8 oz	0 69	67	109	68 1
134	Eserine (Physostigmine)		1 gr	0 25		11	
150	Eserine Sulphate (Physostigmine Sulphate)	U S P VIII	5 gr	0 90	1	6	1 8
49	Ethylmorphine Hydrochloride (Dionin) <sup>1 6</sup>	U S P X	1/8 oz	1 60	34	69	67 9
13	Glycerin <sup>1</sup>	U S P X	10 lbs	2 00	324	132	259 3
103	Guaiacol	U S P X	1 oz	0 29	23	2	8 9
85	Guaiacol Carbonate <sup>1</sup>	U S P X	1 oz	0 77	20	17	28 8
76	Homatropine Hydrobromide <sup>1</sup>	U S P X	5 gr	0 45	10	34	29 8
57	Iodine (Resublimed) <sup>1</sup>	U S P X	1 oz	0 46	23	64	26 2
143	Iodoform (two 1/8 oz)	U S P X	1/4 oz	0 30	2	6	1 7
65	Iron Reduced <sup>1</sup>	U S P X	1 oz	0 20	37	31	19 7
156	Iron (Ferrous) Sulphate (Copperas)	U S P X	1 lb	0 24	5	1	3 6
112	Lead Acetate	U S P X	1 lb	0 35	10	8	7 0
107	Lithium Citrate	N F V	1 oz	0 24	24		2 4
101	Magnesium Carbonate <sup>1</sup>	U S P X	1 lb	0 36	6	20	39 5
50	Magnesium Oxide (light) <sup>1</sup>	U S P X	1 lb	0 69	48	53	59 5
71	Magnesium Oxide (Heavy) <sup>1</sup>	U S P X	1 lb	0 69	57		36 9
69	Magnesium Sulphate <sup>1</sup>	U S P X	1 lb	0 23	16	43	18 8
144	Magnesium Sulphate Anhydrous	U S P X	4 oz	0 31	8		0 7
104	Manganese Dioxide (Precipitate)	U S P IX	4 oz	0 28	25		3 3
26	Menthol <sup>1</sup>	U S P X	1 oz	0 44	110	130	140 2
68	Mercury Ammoniated <sup>1</sup>	U S P X	1 oz	0 23	15	45	32 8
61	Mercury Chloride Corrosive (Corrosive Sublimite) <sup>1</sup>	U S P X	1 oz	0 18	25	53	43 2
121	Mercury Iodide, Red (Bimodide)	U S P X	1 oz	0 42	9	5	5 0
113	Mercury Iodide Yellow (Protoiodide)	U S P X	1 oz	0 43	10	7	3 1
74	Mercury Oxide Yellow <sup>1</sup>	U S P X	1 oz	0 34	28	25	13 7
40	Methenamine <sup>1</sup>	U S P X	4 oz	0 24	124	10	65 7
138	Methylene Blue	U S P X	1 oz	0 30	10		2 7
27	Milk Sugar (Lactose) <sup>1</sup>	U S P X	1 lb	0 47	129	104	96 3
151	Morphine <sup>6</sup>	U S P X	1/8 oz	1 50	6		1 2
28	Morphine Sulphate <sup>1 6</sup>	U S P X	1/8 oz	1 45	197	31	93 0
77	Naphthalene	U S P VIII	1 lb	0 23		44	0 3
23	Phenobarbital <sup>1</sup>	U S P X	1 oz	0 78	174	82	184 9
139	Phenobarbital Sodium		1/4 oz	0 93	3	7	20 5
7	Phenol <sup>1</sup>	U S P X	1 lb	0 43	300	353	230 4
20	Phenolphthalein <sup>1</sup>	U S P X	4 oz	0 33	188	91	97 3
25	Phenyl Salicylate (Salol) <sup>1</sup>	U S P X	4 oz	0 39	160	84	131 0



48	Pilocarpine Hydrochloride <sup>1</sup>	U S P X	5 gr	0 26	23	81	21 2
45	Potassium Acetate <sup>1</sup>	U S P X	4 oz	0 24	79	36	46 3
114	Potassium Bicarbonate <sup>1</sup>	U S P X	1 lb	0 31	9	8	17 6
52	Potassium Bromide <sup>1</sup>	U S P X	4 oz	0 18	67	33	53 5
58	Potassium Chlorate <sup>1</sup>	U S P X	4 oz	0 22	63	24	32 7
151	Potassium Chloride	N F V	1 lb	0 30	6	1	3 4
55	Potassium Citrate <sup>1</sup>	U S P X	4 oz	0 24	71	22	96 0
15	Potassium Iodide <sup>1</sup>	U S P X	4 oz	0 73	279	149	157 8
89	Potassium Permanganate <sup>1</sup>	U S P X	4 oz	0 17	19	15	22 0
54	Potassium Sulphocyanate		4 oz	0 33	79	16	12 7
161	Potassium Sulphurated (Potassium Sulphide)	U S P X	4 oz	0 28		5	5 1
63	Quinine Bisulphate	U S P X	1 oz	0 76	67	5	16 3
145	Quinine Dihydrochloride	U S P X	1 oz	0 88	5	3	1 1
122	Quinine Hydrobromide	U S P X	1 oz	0 81	2	12	8 9
72	Quinine Hydrochloride	U S P X	1 oz	0 83	33	23	11 0
123	Quinine Salicylate	U S P IX	1 oz	0 83	9	5	9 2
22	Quinine Sulphate <sup>1</sup>	U S P X	1 oz	0 65	169	96	111 4
32	Resorcinol (Resorcin) <sup>1</sup>	U S P X	1 oz	0 27	32	167	56 9
152	Santonin	U S P X	1/4 oz	1 32	5	2	4 9
162	Silver Iodide		1 oz	0 95		5	0 5
124	Silver Nitrate <sup>1</sup>	U S P X	1 oz	0 39	11	3	10 4
117	Sodium Acetate	U S P X	4 oz	0 21	15	1	3 7
163	Sodium Arsenate	N F V	4 oz	0 24	5		1 9
8	Sodium Benzoate <sup>1</sup>	U S P X	4 oz	0 23	507	139	102 1
10	Sodium Bicarbonate <sup>1</sup>	U S P X	1 lb	0 14	334	234	352 6
36	Sodium Borate <sup>1</sup> (4 oz crystals, 4 oz powders)	U S P X	8 oz	0 40	23	139	59 5
5	Sodium Bromide <sup>1</sup>	U S P X	1 lb	0 53	466	301	310 5
105	Sodium Chloride <sup>1</sup>	U S P X	1 lb	0 11	15	10	12 4
33	Sodium Citrate <sup>1</sup>	U S P X	4 oz	0 19	164	33	44 5
158	Sodium Hypophosphite	N F V	4 oz	0 33		6	1 2
38	Sodium Iodide <sup>1</sup>	U S P X	4 oz	1 02	89	52	46 2
94	Sodium Nitrite	U S P X	4 oz	0 20	22	11	7 9
118	Sodium Perborate	N F V	1 lb	0 10	1	14	2 7
119	Sodium Phosphate <sup>1</sup>	U S P X	1 lb	0 26	6	9	16 2
115	Sodium Phosphate Mono basic (Sodium Biphosphate) <sup>1</sup>	U S P X	4 oz	0 27	7	10	12 7
6	Sodium Salicylate <sup>1</sup>	U S P X	1 lb	0 75	576	156	242 0
135	Sodium Sulphate (Glauber's Salt)	U S P X	1 lb	0 25	2	9	6 6
159	Sodium Sulphocyanate		1 oz	0 19	5	1	2 5
64	Starch <sup>1</sup>	U S P X	1 lb	0 31	12	57	33 2
90	Strontium Bromide <sup>1</sup>	U S P IX	4 oz	0 27	15	19	41 7
164	Strontium Salicylate	U S P X	1 oz	0 22	5		11 7
125	Strychnine	N F V	1/8 oz	0 19	1	13	2 5
110	Strychnine Nitrate	U S P X	1/8 oz	0 20	21	1	4 3
14	Strychnine Sulphate <sup>1</sup>	U S P X	1/8 oz	0 16	310	140	134 8
80	Sucrose <sup>1</sup>	U S P X	1 lb	0 27	41		18 7
129	Sulphonethylmethane (Trional)	U S P X	1 oz	0 50	2	11	4 1
78	Sulphonmethane (Sulphonal)	U S P X	1 oz	0 40	3	39	8 5

39	Sulphur Precipitated <sup>1</sup>	U S P X	1 lb	0 36	32	103	47 6
153	Sulphur Washed	U S P X	1 lb	0 22	7		5 6
142	Talcum	U S P X	1 lb	0 17	3	6	11 0
108	Terpin Hydrate <sup>1</sup>	U S P X	4 oz	0 21	21	3	12 8
146	Theophyllin	U S P X	1 oz	1 65		8	3 3
136	Thymol	U S P X	1 oz	0 26	2	9	9 1
66	Veronal (Barbital)	U S P X	1 oz	3 00	48	18	
160	Zinc Acetate	U S P X	4 oz	0 18	6		1 8
42	Zinc Oxide <sup>1</sup>	U S P X	1 lb	0 39	49	80	102 1
126	Zinc Phenolsulphonate	U S P X	4 oz	0 17	5	9	7 0
88	Zinc Phosphide		1 oz	0 24	35		1 8
87	Zinc Sozoiodolate (Sozo-iodole Zinc)		25 Gm	3 25	2	34	3 6
21	Zinc Sulphate <sup>1</sup>	U S P X	4 oz	0 20	42	229	117 3
Total				\$93 51	12,723	9364	

NOTE These 164 leading chemical items have an average cost of \$0 57

<sup>1</sup> These items appeared as leading ingredients in the prescriptions studied in each of the four states represented in the "U S P-N F Ingredient Survey" See text following Table XLII

<sup>2</sup> This item was prescribed under the name "Phenacetin" 441 times in prescriptions from commercial type stores and 223 times in professional store prescriptions

<sup>3</sup> This item was prescribed as a manufacturer's specialty 92 times in prescriptions from commercial type stores and 88 times in professional store prescriptions

<sup>4</sup> See foot-notes 121 and 122 on pages 128 and 129 of 'The Prescription Ingredient Survey' published by the AMERICAN PHARMACEUTICAL ASSOCIATION

<sup>5</sup> Also see "Veronal" which is listed separately to show the demand under each name

<sup>6</sup> Items so marked come within the scope of the Federal Narcotic Law An official order blank and a monthly report is absolutely necessary

TABLE XXXIX —LIST OF 234 GALENICALS AND RELATED ITEMS OCCURRING 5 TIMES OR MORE PER 10,000 PRESCRIPTIONS FROM PROFESSIONAL AND COMMERCIAL TYPE DRUG STORES

Rank in Group	Leading Galenicals	Source of Authority	Unit	Unit Price	Number of Occurrences per 10,000 Prescriptions		
					St. Louis Commercial Type Drug Stores	St. Louis Professional Pharmacies	Average in Pharmacies throughout the U. S.
102	Aloin <sup>1</sup>	U S P X	1 oz	\$0 18	12	14	12 6
<i>Capsules</i>							
183	Aspirin Phenacetine and Caffeine		100	0 46	4	5	6 8
227	Elastic Copaiba, 10 mm		12	0 23		5	1 2
148	Corpus Luteum (5 and 2 grains)		50	3 65	4	9	3 2
125	Digitalis	U S P X	100	0 85		18	1 4
177	Ephedrine Sulphate <sup>2</sup> / <sub>3</sub> gr		40	0 85	5	5	13 6
229	Iron, Quinine and Strychnine		100	0 60		5	0 7
<i>Concentrations or Resinoids</i>							
103	Cascarn		1 oz	0 42	23	3	6 2
192	Podophyllin	U S P X	1 oz	0 89	6	3	6 8

*Elixirs*

138	Calisaya <sup>1</sup>	N F V	1 pt	0 87	11	4	14 8
217	Five Bromides	N F V	1 pt	0 99		6	3 4
119	Gentian	N F V	1 pt	1 08	8	11	4 9
83	Gentian Glycerinated <sup>1</sup>	N F V	1 pt	0 96	34	3	23 5
84	Glycerophosphates Comp <sup>1</sup>	N F V	1 pt	1 11	23	14	27 6
121	Glycerophosphates Lime and Soda <sup>1</sup>	N F V	1 pt	1 08	5	14	16 8
22	Iron, Quinine and Strychnine <sup>1</sup>	N F V	1 pt	1 05	93	44	61 6
1	Lactated Pepsin		1 gal	2 25	290	70	324 3
39	Pepsin (Digestive) Compound <sup>1</sup>	N F V	1 pt	0 60	56	41	
23	Pepsin and Rennin Compound (Essence of Pepsin) <sup>1</sup>	N F V	1 pt	0 85	63	56	51 2
75	Phenobarbital <sup>1</sup>		1 pt	1 08	20	23	138 0
150	Potassium Bromide	N F V	1 pt	0 99	13		10 7
162	Salicylic Acid Compound		1 pt	0 96	6	6	0 5
152	Saw Palmetto and Santal	N F V	1 pt	0 99	8	5	3 8
25	Simple <sup>1</sup>	U S P X	1 pt	0 60	107	28	63 7
36	Sodium Bromide	N F V	1 pt	0 90	54	47	30 7
93	Sodium Salicylate	N F V	1 pt	0 97	6	27	4 8
163	Sodium Sulphocyanate	N F V	1 pt	0 81	4	8	2 7
48	Terpin Hydrate <sup>1</sup>	N F V	1 pt	2 19	53	18	50 0
23	Terpin Hydrate and Codeine <sup>1 2</sup>	N F V	1 pt	2 19	91	45	45 0
198	Terpin Hydrate and Creosote	N F V	1 pt	1 05	8		0 8
181	Terpin Hydrate and Heroin	N F IV	1 pt	2 20	3	7	19 5
165	Three Bromides <sup>1</sup>	N F V	1 pt	0 93	12		31 7

*Extracts (Powdered and Solid)*

154	Aconite	U S P IX	1 oz	0 60	8	4	4 1
27	Belladonna <sup>1</sup>	U S P X	1 oz	0 54	94	28	79 1
20	Cascara Sagrada <sup>1</sup>	U S P X	1 oz	0 45	32	128	40 0
226	Cinchona	N F IV	1 oz	0 90	5		0 5
203	Colocynth Compound	U S P X	1 oz	0 48	7		7 9
146	Ergot <sup>1</sup>	U S P IX	1 oz	1 20	12	2	4 7
82	Ergotine (Bonjean)	N F V	1 oz	1 79	22	15	12 0
106	Gentian	N F V	1 oz	0 36	10	15	9 9
72	Hyoscyamus <sup>1</sup>	U S P X	1 oz	0 60	19	25	35 3
34	Nux Vomica <sup>1</sup>	U S P X	1 oz	0 54	53	50	35 7
141	Opium <sup>2</sup>	N F V	1/2 oz	3 12	6	9	12 0
223	Valerian		1 oz	0 72		6	4 3

*Fluidextracts*

215	Buchu	U S P X	1/4 oz	0 87	6		2 1
54	Cascara Sagrada <sup>1</sup>	U S P X	1 pt	1 34	28	30	37 5
19	Cascara Sagrada Aromatic <sup>1</sup>	U S P X	1 pt	1 44	112	49	70 5
204	Condurango	N F V	4 oz	0 67		7	2 5
71	Ergot <sup>1</sup>	U S P X	4 oz	0 87	33	11	37 4
170	Hydrastis	U S P X	1 oz	0 72	6	5	6 8

149	Hyoscyamus	U S P X	4 oz	0 72	13		3 8
219	Kola	N F V	4 oz	0 63		6	1 1
88	Licorice	U S P X	4 oz	0 42	12	22	11 2
222	Triticum	N F V	4 oz	0 45	6		2 3
95	Valerian	N F V	4 oz	0 78	31		3 1

*Glandular Substances, Dessicated*

68	Corpus Luteum <sup>1</sup>		1 oz	3 19	12	34	11 1
33	Ovarian Substance Dessicated <sup>1</sup>		1 oz	2 13	26	80	43 2
191	Parathyroid		$\frac{1}{8}$ oz	2 55	1	8	2 7
58	Pituitary Substance <sup>1</sup>		1 oz	3 40	9	48	32 2
136	Suprarenal Gland	U S P IX	1 oz	1 70	3	13	4 8
4	Thyroid <sup>1</sup>	U S P X	1 oz	0 85	66	209	88 6
126	Infusion Digitalis	U S P X	1 pt	0 50	8	9	8 8
43	Inhalant, Ephedrine <sup>1</sup>		1 oz	0 80	39	47	65 2
60	Inhalant Ephedrine Compound <sup>1</sup>		1 oz	0 80	56		15 6

*Linniment*

216	Camphor	U S P X	1 pt	1 05	6		4 4
111	Chloroform <sup>1</sup>	U S P X	1 pt	0 84	23	1	12 5
135	Soft Soap	U S P X	1 pt	0 84	13	3	3 4
139	Liver Extract		1 box (24 vials)	4 55	6	9	6 0

*Lotion*

76	Calamine <sup>1</sup>	N F V	2 pt	0 40	24	17	43 9
107	Resorcin Compound		1 pt	0 40		25	1 2
50	Mass Iron Carbonate <sup>1</sup>	U S P X	4 oz	0 22	14	48	22 6
30	Mass Iron Carbonate Saccharated <sup>1</sup>	U S P X	4 oz	0 22	104	9	21 2
129	Milk of Bismuth <sup>1</sup>	N F V	1 pt	0 85	12	5	24 8
2	Milk of Magnesia <sup>1</sup>	U S P X	1 pt	0 42	208	109	76 0

*Mixtures*

105	Chalk <sup>1</sup>	U S P X	1 pt	0 50	21	4	19 4
14	Licorice (Glycyrrhiza) Compound <sup>1</sup>	U S P X	1 pt	0 64	124	52	89 4
89	Pectoral	N F V	1 pt	0 85	31	3	16 7
117	Rhubarb and Soda <sup>1</sup>	N F V	1 pt	0 67	5	15	52 3
113	Mucilage of Acacia <sup>1</sup>	U S P X	1 pt	0 25	19	5	10 8
11	Oil of Rose Compound <sup>2 4</sup>		4 oz	1 00	11	188	20 8
280	Oil of Rose Compound with Codeine <sup>2 4</sup>		1 oz	0 67	5		0 4

*Ointments and Ointment Bases*

200	Acid Boracic	U S P X	1 lb	0 90		7	12 0
214	Balm Analgesic		(tube)				
			1 oz	0 21	5	1	7 0
131	Belladonna	U S P X	1 lb	1 49	5	11	9 6
224	Benzonated Lard	U S P X	1 lb	0 56	5		10 1
159	Diachylon (Lead Oleate)	U S P X	1 lb	1 62	12		3 7
145	Ephedrine Jelly		$\frac{1}{2}$ oz (1 tube)	0 36	5	9	0 9
40	Lanolin, Hydrous <sup>1</sup>	U S P X	1 lb	0 34	55	42	81 0
35	Lassar's Zinc Paste	N F V	1 lb	0 85	3	98	28 0
78	Mercury Ammoniated <sup>1</sup>	U S P X	1 lb	1 44	23	18	56 4

57	Mercury Yellow Oxide <sup>1</sup>	U S P X	4 tubes	0 44	8	49	34 8
37	Petrolatum <sup>1</sup>	U S P X	1 lb	0 25	42	58	92 0
92	Petrolatum, White <sup>1</sup>	U S P X	1 lb	0 50	23	10	71 2
26	Pine Tar	U S P X	1 lb	1 08	10	116	13 0
122	Resorcinol Compound	N F V	1 lb	2 40	2	17	4 4
46	Rose Water <sup>1</sup>	U S P X	1 lb	0 94	39	34	57 9
233	Sulphur	U S P X	1 lb	1 20	5		10 0
108	Sulphur Compound	N F V	1 lb	1 20		25	0 8
199	Whitfield		1 lb	1 50	1	7	3 0
79	Zinc Oxide <sup>1</sup>	U S P X	1 lb	0 72	26	15	28 4

*Pills*

65	Blaud	U S P X	100	0 30	32	20	12 2
175	Blaud Compound		100	0 33	8	2	2 2
157	Cathartic Compound		1000	3 30	12		2 2
210	Iron Quinine and Strychnine		100	0 63	7		1 0
140	Mercury Protoiodide		100				
			1/4 gr	0 33	8	7	2 6
189	Mixed Treatment		100	1 37	1	8	1 2
101	Strychnine Sulphate		100	0 27	6	21	4 0

*Powders*

110	Antiseptic	N F V	4 oz	0 30	15	9	4 6
62	Ipecac and Opium <sup>1</sup> <sup>2</sup>	U S P X	1 oz	0 36	19	36	36 5
128	Mercury and Chalk	U S P X	4 oz	0 30	12	5	1 6
98	Pepsin <sup>1</sup>	U S P X	1 oz	0 43	9	20	
100	Pepsin Lactated	N F III	1 oz	0 30	13	14	2 8
179	Pepsin Saccharated	N F V	1 oz	0 21	9	1	3 0
212	Soft Soap	U S P X	1 lb	0 76	6	1	

*Solutions*

109	Alkaline Aromatic	N F V	1 pt	0 60	15	9	9 7
61	Ammonium Acetate <sup>1</sup>	U S P X	4 oz	0 35	46	9	24 2
193	Antiseptic	N F V	1 pt.	0 43	7	1	4 1
137	Boric Acid		1 pt	0 30	7	8	
155	Boroglyceride (Glycerite of Boroglycerin)	U S P X	1 pt	1 44	4	8	4 6
87	Calcium Hydroxide (Lime Water) <sup>1</sup>	U S P X	1 gal	0 70	17	17	40 6
56	Coal Tar (Liquor Carbonis Detergens) <sup>1</sup>	N F V	8 oz	0 83	5	52	27 0
112	Ephedrine Sulphate <sup>1</sup>		1 oz	0 51	24		34 4
207	Ferric (Iron) Chloride		1 pt	0 60	7		0 7
49	Iodine Compound <sup>1</sup>	U S P X	4 oz	0 40	28	37	21 6
171	Iodine Phenolated (Boulton's Solution)	N F V	1 oz	0 35	7	4	2 9
209	Iron and Ammonium Acetate (Basham's Mixture) <sup>1</sup>	U S P X	1 pt	1 00	6	1	22 7
127	Iron Peptonized and Manganese <sup>1</sup>	N F V	1 pt	0 85	12	5	17 2
220	Lead Subacetate (Dilute)	N F V	1 pt	0 30	6		0 7
42	Normal Salt	U S P X	1 gal	0 36	37	51	19 5
16	Potassium Arsenite (Fowler's Solution) <sup>1</sup>	U S P X	1 pt	0 57	122	49	73 7
231	Potassium Citrate	U S P X	1 pt	0 30	5		4 8

142	Sodium Borate Compound (Dobell's) <sup>1</sup>	N F V	1 pt	0 30	6	9	14 9
67	Surgical Solution of Chlorinated Soda (Dakin's Solution) <sup>1</sup>	U S P X	1 qt	0 36	51		0 5
<i>Spirits</i>							
124	Aromatic Ammonia	U S P X	1 pt	1 20	12	6	37 1
169	Camphor	U S P X	1 pt	1 49	4	7	9 3
77	Chloroform <sup>1</sup>	U S P X	$\frac{1}{2}$ pt	0 40	34	7	25 0
41	Nitrous Ether <sup>1</sup>	U S P X	1 pt	0 80	83	13	41 3
74	Nitroglycerine	U S P X	1 oz	0 30	17	27	8 5
173	Peppermint <sup>1</sup>	U S P X	1 pt	1 99	7	4	16 0
<i>Syrups</i>							
17	Simple <sup>1</sup>	U S P X	1 gal	0 72	85	84	89 5
52	Acacia	U S P IX	1 pt	0 25	45	15	15 0
143	Ammonium Hypophosphite	N F V	1 pt	0 72	12	2	8 2
98	Bromides	N F V	1 pt	1 14	29		5 1
13	Cocillana Compound <sup>1</sup>		1 pt	0 85	162	14	94 0
115	Cocoa	N F V	1 pt	0 30	21		6 4
133	Euphorbia Compound		1 pt	0 90	16		5 8
18	Ginger	U S P X	1 pt	0 48	160	6	19 2
134	Hydrodic Acid <sup>1</sup>	U S P X	1 pt	0 72	10	6	36 3
94	Hypophosphites	N F V	1 pt	0 78	31		7 3
10	Hypophosphites Compound <sup>1</sup>	N F V	1 pt	0 81	188	13	30 8
47	Ipecac <sup>1</sup>	U S P X	1 pt	1 05	58	14	48 4
194	Ipecac and Opium <sup>3</sup>	N F V	1 pt	1 44	7	1	8 5
86	Iron Iodide <sup>1</sup>	U S P X	1 pt	1 20	12	24	28 0
55	Lemon (Citric Acid) <sup>1</sup>	U S P X	1 pt	0 35	49	9	27 2
44	Licorice	N F V	1 pt	0 60	71	9	14 8
32	Orange <sup>1</sup>	U S P X	1 pt	0 35	104	2	54 5
81	Raspberry <sup>1</sup>	N F V	1 pt	0 35	37	2	25 3
180	Rhubarb Aromatic	U S P X	1 pt	0 78	6	4	5 3
3	Sarsaparilla Compound <sup>1</sup>	U S P X	1 pt	1 14	257	36	64 6
153	Senega	U S P X	1 pt	0 90	7	6	5 9
71	Squill <sup>1</sup>	U S P X	1 pt	0 75	35	10	32 7
8	Tolu <sup>1</sup>	U S P X	1 pt	0 72	214	30	109 7
221	Trifolium Compound	N F V	1 pt	1 05	6		5 3
24	White Pine Compound with Tar		1 pt	0 72	57	79	
6	Wild Cherry <sup>1</sup>	U S P X	1 pt	0 72	172	82	121 8
63	Yerba Santa	N F V	1 pt	0 96	51	4	11 2
<i>Tablets</i>							
130	Amidopyrine <sup>1</sup>		100	0 87	4	12	24 3
213	Atropine Sulphate		100	0 21	1	5	8 7
184	Barbital		110 (1 tube 10, 1 bottle 100)	0 95	3	6	11 2
167	Blaud Compound		100	0 28	2	9	7 9
168	Blaud		100	0 24	2	9	3 8
225	Calcium Carbonate		100	0 27		5	3 7
132	Calcium Lactate		100	0 30	4	12	7 7
186	Calomel	N F V	500 (5 assorted sizes)	1 05	7	2	7 2

91	Cinchophen <sup>1</sup>		200 (100—5 grs, 100— 7½ grs )	0 96	19	14	29 6
187	Codeine Phosphate (Hypo) <sup>2</sup>		200	1 32	1	8	6 1
59	Codeine Sulphate <sup>1 1</sup>		100	2 55	19	37	92 2
188	Corpus Luteum		50—5 grs	2 17	2	7	13 6
205	Coryza		100	0 35	1	6	4 3
206	Digitain		100—1/100 gr	0 39		7	1 3
160	Digitalis		100	0 32		12	7 3
114	Dobell		100	0 47	1	21	2 8
178	Mercury Bichloride (Corrosive)	U S P IX	100	0 35	4	6	4 6
116	Mercury and Chalk		100—1 gr	0 21	9	11	2 7
211	Mercury Protoiodide		100—1/4 gr	0 21		7	4 2
51	Methenamine <sup>1</sup>		200 (100—5 grs 100— 7½ grs )	0 69	51	10	25 3
73	Methenamine and So dium Acid Phosphate		100	0 42	21	23	14 7
195	Mixed Treatment		100	0 21	7	1	1 4
29	Morphine Sulphate <sup>1 1</sup>		4 tubes assorted	1 56	25	91	115 5
196	Morphine Sulphate (Hypo Units) <sup>1</sup>		6—1/4 grs 1 pack- age)	1 49		8	
190	Neo Cinchophen		20—5 grs	0 45	2	7	
172	Ovarian Substance <sup>1</sup>		100—5 grs	2 55	2	9	20 0
53	Phenobarbital <sup>1</sup>		200 (100— 1/2 gr 100—1½/2 grs )	1 24	16	44	105 5
232	Pituitary Whole Gland		100—1 gr	1 67		5	1 3
151	Rhinitis (Full Strength)		100	0 36	4	9	4 8
118	Sodium Salicylate		100	0 27	5	15	5 9
164	Strychnine Sulphate <sup>1</sup>		600 assort- ed	1 26	2	10	12 7
38	Thyroid (1/4 1/2, 1, 2 grs ) 100 each <sup>1</sup>		400	1 75	25	75	54 0
<i>Tincture</i>							
80	Aconite <sup>1</sup>	U S P X	4 oz	0 54	26	14	33 8
15	Belladonna <sup>1</sup>	U S P X	1 pt	1 44	87	85	177 5
185	Benzoin	U S P X	4 oz	0 66	9		12 0
85	Benzoin Compound <sup>1</sup>	U S P X	4 oz	0 60	20	16	29 3
156	Calendula	N F V	4 oz	0 95	12		3 0
201	Capsicum	U S P X	4 oz	0 66	5	2	10 4
176	Cardamom	U S P X	4 oz	0 45	10	2	3 8
99	Cardamom Compound <sup>1</sup>	U S P X	1 pt	1 56	12	15	43 9
157	Cinchona	U S P X	4 oz	0 63	2	10	3 1
144	Cudbear <sup>1</sup>	N F V	4 oz	0 54	11	3	17 8
7	Digitalis <sup>1</sup>	U S P X	1 pt	0 80	177	72	156 1
208	Gelsemium	N F V	4 oz	0 54	5	2	5 2
228	Gentian <sup>1</sup>		4 oz	0 42	5		3 4
120	Gentian Compound <sup>1</sup>	U S P X	4 oz	0 42	11	8	70 8
70	Hyoscyamus <sup>1</sup>	U S P X	4 oz	0 48	20	25	95 5

96	Iodine <sup>1</sup>	U S P X	2 pts	2 35	21	9	20 1
64	Iron Chloride <sup>1</sup>	U S P X	1 pt	1 44	30	23	27 9
161	Lobelia <sup>1</sup>	U S P X	4 oz	0 51	7	5	11 7
5	Nux. Vomica <sup>1</sup>	U S P X	1 pt	1 32	150	120	234 7
31	Opium <sup>1 3</sup>	U S P X	4 oz	1 74	67	43	41 2
21	Opium Camphorated <sup>1 2</sup> (Paregoric)	U S P X	1 pt	1 32	135	22	128 2
234	Strophanthus	U S P X	4 oz	0 87	5		6 b
123	Viosterol <sup>1</sup> (asst mfgs 5 cc vials)		<sup>1</sup> / <sub>4</sub> oz	1 50	4	15	31 0
<i>Water</i>							
174	Ammonia	U S P X	1 lb	0 27	10		1 7
	Anise	U S P X	1 pt	0 36	15	10	7 2
9	Camphor <sup>1</sup>	U S P X	1 pt	0 36	50	190	71 4
66	Chloroform <sup>1</sup>	U S P X	1 pt	0 50	17	35	16 7
90	Cinnamon <sup>1</sup>	U S P X	1 pt	0 36	22	11	20 4
12	Peppermint <sup>1</sup>	U S P X	1 pt	0 48	169	20	130 7
45	Rose <sup>1</sup>	U S P X	1 pt	0 72	45	31	53 7
197	Spearmint	U S P X	1 pt	0 36	6	2	2 4
147	Witch Hazel	N F V	1 gal	1 26	4	10	12 3
<i>Wine</i>							
182	Antimony	U S P VIII	4 oz	0 51	7	2	3 8
202	Colchicum	N F IV	4 oz	0 57	7		3 8
158	Colchicum Seed <sup>1</sup>	N F IV	4 oz	0 55	5	7	13 4
218	Ipecac	U S P VIII	4 oz	0 72	6		11 5
Total				\$206 15	6713	4644	

NOTE These 234 galenicals and pharmaceuticals have an average cost of \$0 88

<sup>1</sup> These items appeared as leading ingredients in the prescriptions studied in each of the four states represented in the "U S P-N F Ingredient Survey" See text following Table XLII <sup>2</sup> An exempt narcotic Official order blank not required however record of sales must be kept <sup>3</sup> Items so marked come within the scope of the Federal Narcotic Law An official order blank and a monthly report is absolutely necessary <sup>4</sup> A private formula

TABLE XL.—LIST OF 33 BOTANICALS OILS, RELATED PRODUCTS AND OTHER MISCELLANEOUS INGREDIENTS OCCURRING FIVE TIMES AND OVER PER 10,000 PRESCRIPTIONS

INGREDIENTS OCCURRING FIVE TIMES AND OVER PER 10,000 PRESCRIPTIONS					Number of Occurrences per 10 000 Prescriptions.			
Group Rank.		Source of Authority	Unit.	Unit Price	St. Louis			
					Commercial Type Stores	St. Louis Professional Pharmacies	Average in Pharmacies throughout the U. S.	
<i>Botanical Drugs Crude and Powdered</i>								
2	Acacia Granulated <sup>1</sup>	U S P X	1 lb	\$0 49	79	38	28 0	
27	Aloes Powdered	U S P X	1 oz	0 06	7	1	2 0	
8	Asafetida	U S P X	1 oz	0 20	37	1	5 7	
16	Balsam Peru	U S P X	2 oz	0 50	13	8		
10	Capsicum Powdered	U S P X	1 oz	0 10	25	7	8 2	
18	Digitalis Powdered <sup>1</sup>	U S P X	1 oz	0 20		18	26 7	
12	Ipecac Powdered	U S P X	1 oz	0 20	15	15	15 9	
38	Jalap Powdered	U S P X	1 oz	0 06	5		1 6	
28	Licorice Powdered	U S P X	4 oz	0 15	8		2 9	
9	Opium Powdered <sup>1 2</sup>	U S P X	<sup>1</sup> / <sub>2</sub> oz	0 73	20	16	21 6	
7	Rhubarb Powdered <sup>1</sup>	U S P X	1 oz	0 42	24	15	24 6	
33	Psyllium Seed		5 lbs	1 50		5	1 6	



*Oils**Fixed or Expressed*

5	Castor <sup>1</sup>	U S P X	1 gal	1 30	12	41	24 9
11	Cocoa Butter <sup>1</sup>	U S P X	1 lb	0 35	13	18	32 7
14	Cod Liver <sup>1</sup>	U S P X	1 pt	0 50	5	21	9 7
29	Linseed	U S P X	2 pts	0 30	5	2	0 9
15	Olive <sup>1</sup>	U S P X	2 pts	1 18	3	20	29 8

*Volatile*

19	Bergamot	N F V	1 oz	0 28	9	9	5 0
21	Cinnamon	U S P X	1/2 oz	0 80	13	3	8 9
13	Eucalyptol <sup>1</sup>	U S P X	1/4 lb	0 34	18	9	9 9
6	Eucalyptus <sup>1</sup>	U S P X	1 lb	0 45	15	24	24 0
22	Fennel <sup>1</sup>	U S P X	1 lb	0 30		10	1 7
3	Gaultheria (Methyl Salicylate) <sup>1</sup>	U S P X	1 lb	0 72	62	19	43 8
23	Lavender <sup>1</sup>	U S P X	1 oz	0 40	9	1	4 7
30	Lemon	U S P X	1 oz	0 60	6		1 8
4	Peppermint <sup>1</sup>	U S P X	2 oz	0 75	52	11	42 1
24	Pine Needles <sup>1</sup>	U S P X	1 oz	0 22	5	5	6 8
17	Rose	U S P VIII	10 M	1 00	12	7	7 7
25	Rose Germanium		1 oz	0 75	6	4	1 1
20	Santal—East Indian	U S P X	1 oz	0 85	12	5	8 6

*Miscellaneous*

31	Agar	U S P X	1/4 lb	0 68	1	5	1 0
26	Coal Tar, Crude (Pix Carbons)	N F V	1 lb	0 25	1	9	1 3
1	Liquid Petrolatum <sup>1</sup>	U S P X	1 pt	0 50	57	87	82 2

Total

\$17 13      549      434

NOTE These 33 leading items have an average cost of \$0 52

<sup>1</sup> These items appeared as leading ingredients in the prescriptions studied in each of the four states represented in the "U S P-N F Ingredient Survey" See text following Table XLII<sup>2</sup> This item comes within the scope of the Federal Narcotic Law An official order blank and a monthly report is absolutely necessaryANALYSIS OF LEADING MANUFACTURERS' SPECIALTIES CLASSIFIED INTO GROUPS  
ACCORDING TO THEIR THERAPEUTIC USE AND ACTION

The policy of the Department of Commerce of not publishing brand names precludes the inclusion of a similar list of the 253 manufacturers' specialties found to be leading ingredients. However, in the following table these specialties have been classified into 26 groups according to therapeutic use and action. The number of different specialty items in each group is shown, as is the total number of times that the specialties in each group were prescribed. The forms of the specialties in each group are shown in parentheses after the description of the therapeutic use and action. In a few cases certain specialty items had dual and even triple uses and were placed in each of the groups concerned. For this reason, uses are shown for 258 rather than 253 items with a corresponding increase in the number of times that the leading items were used.

It is hoped that this summary of the leading specialties will be of value to manufacturers, pharmacists, physicians and others who may be interested. Any manufacturer is at liberty to communicate with the Bureau of Foreign and Domestic Commerce in Washington, D. C. to obtain information concerning the appearance of his products in the 20,000 prescriptions studied in the Survey. If any clerical work is required to obtain the information desired, the manufacturer may defray that cost and the information will be supplied if the request is a reasonable one.

In the first prescription department report from the Survey, a similar summary was made of leading manufacturers' specialties occurring in 15,063 prescriptions filled in 13 commercial type drug stores. All but one of the leading specialties in that first list were found among the leading specialties in the present study of 20,000 prescriptions. However, in the first report only those ingredients which occurred 25 times or more were considered leading ingredients while in the present report all ingredients occurring at least five times are classed as leading ingredients.

Of the 253 leading specialties, 52 (20.6 per cent) appeared at least 10 times per 10,000 prescriptions in *each* of the four states represented in the "U S P-N F Ingredient Survey," thus showing a popular demand from coast to coast.

TABLE XLI—DISTRIBUTION OF 253 LEADING SPECIALTIES INTO GROUPS ACCORDING TO THERAPEUTIC ACTION AND USE

Group	Therapeutic Action and Use	No of Different Specialty Items	Total No of Times Prescribed.
A	Expectorants, sedative expectorants, vehicles for cough mixtures, and other preparations for various diseases of the respiratory tract (Ampuls 1, liquids 20, powders or crystals 2, tablets 2)	25	819
B	Digestants and gastric correctives, enzymic liquids, also colitis disturbance powder and tablets (Liquids 7, powders or crystals 7, tablets 3, capsules 1)	18	997
C	Hypnotics and sedatives (Liquids 8, powders or crystals 7, tablets 8, capsules 2)	25	1549
D	Analgesics antipyretics and antirheumatics (Liquids 1, powders or crystals 7, tablets 4, capsules 1)	13	576
E	General tonics, stimulating diet and auxiliary foods, malt and Bland preparations, cod liver oil concentrates, vitamin fortified products, preparations prescribed in the treatment of secondary anemia general "run down" conditions malnutrition and convalescence, lack of appetite and vigor (Liquids 27, powders or crystals 2, tablets 4)	33	721
F	Laxatives in various forms, including fluidextract cascara sagrada, aromatic type, effervescent salts, liquid petrolatum and emulsion of agar agar and petrolatum (Effervescent salts 1, liquids 10, tablets 4, pills, granules, etc 2, ointments and jellies 1)	18	723
G	Antiseptics, germicides, prophylaxis of the silver protein type in colloidal form, also other silver solutions and products used in conjunctivitis, urethral irrigations, gynecologic practice, infections of the genito urinary tract and of the eye, ear, nose and throat (Liquids 1, powders or crystals 5)	6	450
H	Glandular or organotherapeutic products (Ampuls 1, powders or crystals 1, tablets 10)	12	132
I	Staphylococcal infections (Tablets 1)	1	16
J	Emollients, antiphlogistics and ointments (Liquids 1, ointments and jellies 15)	16	751
K	Diuretics, genito-urinary antiseptics and preparations for both internal and external use for venereal diseases, also preparations indicated in cystitis pyelitis and various gynecological diseases, and for application to wounds, etc (Liquids 3, powders or crystals 3, tablets 11, capsules 1)	18	347

L	Gynecological antispasmodics and utero-ovarian and menstrual sedatives and anodynes, derangements of the female functional organs (Liquids 5)	5	58
M	Hemostatics, astringents, vasomotor stimulants, vasoconstrictors (Liquids 1)	1	48
N	Quinine suspended in palatable vehicles (Liquids 2)	2	74
O	Suppositories (Suppositories 1)	1	17
P	Inhalants (Liquids 6)	6	96
Q	Cardiac tonics and heart stimulants and preparations for renal and dropsical conditions, angina pectoris and asthma (Liquids 4, powders 2, tablets 6)	12	420
R	Pneumococciocides (Powders or crystals 1)	1	44
S	Rheumatic effervescent salt of sodium salicylate and other drugs and preparations to relieve rheumatism (Effervescent salts 3, liquids 1, powders or crystals 4, tablets 2, capsules 3)	13	248
T	Oral antiseptics and mouth washes (Liquids 2)	2	18
U	Antiseptic solutions and germicides (organic mercury compounds) and other antiseptics including dusting powder, etc (Liquids 4 powders or crystals 4, tablets 1, capsules 1)	10	332
V	Local anesthetics (Powders or crystals 4)	4	143
W	Alimentary canal and intestinal astringents and sedatives and preparations for diarrhea, cholera morbus, cholera infantum, dysentery, nausea, seasickness, etc (Liquids 4, powders or crystals 3)	7	106
X	Organic iodine preparations—plain and in combinations—indicated in the treatment of arthritis neuritis goitre, syphilis, septic infections and similar conditions, also for inflammation in bone, joint and muscle and other iodine therapy preparations (Liquids 2, powders or crystals 1, tablets 3, capsules 1)	7	75
Y	Contraceptives (Ointments and Jellies 1)	1	10
Z	Roentgenographic visualizations (Tablets 1)	1	16

#### APPEARANCE OF NARCOTICS AMONG THE LEADING INGREDIENTS

It would probably be considered a glaring omission in a report of this character if no separate reference was made to the extent of use and inventory investment required of narcotics, inasmuch as about 10 per cent of all prescriptions filled are narcotics, according to this Survey. As shown in the first prescription department report from the Survey 7822 narcotic prescriptions were filled by 13 commercial type drug stores in a year out of a total of 72 828 prescriptions exclusive of liquor prescriptions.

Of the 164 leading chemicals listed, 11 are narcotics and would cost approximately \$19 for a representative order. Codeine sulphate ranked third of all ingredients used, and third among the chemicals. If codeine alkaloid, sulphate and phosphate were grouped together, codeine and its salts would then rank second of all ingredients, only water having more frequent demand. In addition to the 11 narcotic chemicals, there were 8 narcotics among the leading galeicals, 5 narcotics among the leading specialties, and 1 narcotic in the list of botanicals, oils, etc. The 8 narcotic galeicals would cost \$13 58, the 5 narcotic specialties, \$6 52, and the single narcotic in the list of botanicals, oils, etc., \$0 73. Thus the total cost of narcotics in the four lists would be approximately \$40, a small sum and yet sufficient for the opening order. The inventory value of narcotics in one of the most typical of the survey stores, however, was only \$24 47 divided as follows: chemicals, \$10 18, galeicals, \$12 98, specialties, \$0 70, and botanicals, \$0 61.

The number of narcotics in the galeical list will no doubt, seem rather small. This is due to the fact that different sizes and strengths of a particular narcotic, such as tablets of codeine

sulphate, are not distinguished as separate items. The galenical list also contains four exempt narcotic preparations which do not require a Harrison Act narcotic form, although a record of their sales must be kept.

#### METHODS FOR PRACTICAL USE OF THE LISTS OF LEADING INGREDIENTS

Practical information of the type contained in the lists of leading ingredients should serve a very useful purpose to retail and wholesale pharmacists. Association secretaries, wholesale druggists, professors in colleges of pharmacy and others are frequently questioned concerning the correct cost of a prescription department stock and the proper items to order. The pharmacist should always bear in mind that the prescribing habits of the physicians whose prescriptions he fills govern the movement of the various prescription-department items. He will probably save several hundred dollars if when he opens a drug store, he orders in limited quantities, and only those items which appear on these and other lists of leading ingredients, with the exception of items of an emergency nature which must be kept on hand in anticipation of a rare and urgent call. Then later, as prescriptions are received and the prescribing habits of the contributing physicians determined, he can order carefully to conform with the proved demand. In this way the pharmacist will go far in his effort to prevent the accumulation of "dead" items on his prescription department shelves. With the exception of emergency items, the ingredients comprising the opening order will be items which are shown to be in fairly frequent demand, and which thus have less chance of becoming "shelf-warmers."

The authors feel that if it were possible to bring this report, particularly this part dealing with prescription ingredients, to the attention of the approximately 1800 pharmacists who open new drug stores each year in the United States, a saving of from \$100 to \$500 per store could be accomplished. At a conservative estimate the total saving would be at least \$250,000, a figure several times larger than the total cost of the National Drug Store Survey. (The number of new drug stores opened during the last 41 months up to and including May 1933, was 6064 with 1932 exceeding 1931 and 1930. This data covers new stores only and does not include change in ownership of a going business. These figures are believed to be conservative, as other sources furnish a figure 10 to 25 per cent higher, with the statement that this is considerably less than the average for the past five years due to the depression.)

While approximately 1800 new drug stores have been opened annually during the last few years it is sad to relate that 1387 failed during 1932 according to figures compiled by R. G. Dun & Co. This figure does not include stores which simply closed their doors voluntarily. Therefore let those alert pharmacists who do not wish to be numbered among the failures bear in mind that they are living in a day requiring business efficiency and that solvency may depend upon quickness of assets. As often said goods well-bought are half sold. Concentration of purchases and a studious endeavor to simplify lines and items will simplify buying and allow more time to concentrate on selling. The merchant pharmacist knows the cigars and cigarettes and the flavors of ice cream most in demand and purchases them accordingly. However, often it is the case that an alert buyer in the commercial departments has failed to solve the problem of "dead" stock in his prescription department. One good remedy for this situation is scientific buying—ordering in quantities proportionate to demand through his wholesaler, who performs a real economic function in stabilizing stocks, safeguarding credit, maintaining slow moving prescription department items, and other services which allow the retailer to operate more economically.

These basic ingredient lists should be of use to professors in colleges of pharmacy in instructing and examining students on the subject of the more commonly used ingredients. The report should enable the student to appreciate the economic angles involved. The student and embryo drug store proprietor should compare the lists of leading ingredients with the actual inventory analysis of Store 6-B (Table XXXIV), an excellently managed, fairly modern drug store and note the large number of items—35.4 per cent of the 1451 items stocked, which had no movement or purchase during the Survey year.

Until the pharmacist, particularly the proprietor of the usual commercial type drug store has ascertained the amount of prescription business which he may reasonably expect to do he should beware of the "deal." Very often even at the start, he is tempted to buy from 5 to 25 pounds of this or that chemical, or an assortment of galenicals (elixirs, tinctures, syrups, etc.)

in order to obtain some free goods or an extra discount. It is much better to pay a little more for these items, buying them in small quantities from the wholesaler, and to invest the difference in merchandise of assured movement in this way realizing actual rather than paper profits. Unsold chemicals and pharmaceuticals cannot be used to discount bills. Furthermore, buying them in small quantities until demand is proved assures a "clean" prescription department inventory. If the pharmacist wishes to convince himself of the soundness of this advice, let him examine carefully the list of leading galenicals. Out of 234 galenicals which occurred five times or more in 10 000 prescriptions filled by six commercial type drug stores, only 35 occurred as many as 50 times each. A number of these 35 items, such as tincture of belladonna, digitalis, nux vomica and Fowler's solution, are seldom prescribed other than in comparatively small quantities. Also, other of these items, such as camphor and peppermint waters, simple elixir, simple syrup, syrup of sarsaparilla compound and syrup of wild cherry, are usually manufactured in the store as needed. In addition to the monetary considerations, there is the important question of deterioration and potency to be considered in connection with, to mention a few, tincture of digitalis, fluidextract of ergot, pancreatin and other unstable glandular and organo-therapeutic products.

Of course there are some galenicals, such as elixir of iron, quinine and strychnine, elixir of digestive compound, fluidextract of cascara sagrada aromatic, spirits of nitrous ether and milk of magnesia upon which the pharmacist will probably begin to experience a profitable over-the-counter demand after the store has been established a short time. Even with these additional sales possibilities the pharmacist should wait for a proved demand in a quantity large enough to warrant their purchase in large quantities, and should carefully consider for each item its stability and the possibility of manufacturing it more economically in his own establishment.

In addition to the practical and academic uses of the lists of leading ingredients, just outlined, it is expected that as in the instance of the shorter list contained in the first report, the present lists will prove of value to dealers in botanical drugs, essential oils and other raw materials used in pharmacy and the drug trade, and to manufacturers of chemicals, pharmaceuticals and trade-named specialties. It has been suggested that manufacturers of pharmaceuticals could put the list to practical use as did the chemical manufacturers in the case of the list published in the first report. Certain chemical manufacturers used that list in making up and advertising special deals containing assortments of only those ingredients shown to be in fairly frequent demand. Manufacturers of proprietaries will no doubt be interested particularly in the analysis of the 253 leading manufacturers' specialty items.

Manufacturers of drug fixtures could put the list to actual use in entertaining the design and manufacture of fixtures to meet actual requirements, rather than requiring the pharmacist to follow the present practice of adjusting prescription stocks to fit the shelves of prescription fixture units which have not undergone any marked change during the past 20 or 30 years.

Federal Government agencies such as the Bureau of Food and Drug Administration of the Department of Agriculture, the United States Public Health Service, and the Surgeon General's Offices of the Army and Navy, might find the lists of leading ingredients and other material in the report to be of practical value to them.

#### COMPARISON WITH OTHER LISTS OF LEADING INGREDIENTS--FACTS FROM THE 'U S P-N F PRESCRIPTION INGREDIENT STUDY'

As announced in the first report on the prescription phase of the National Drug Store Survey, the list of ingredients occurring in the 15,063 prescriptions studied in connection with that report, and the list obtained from the 20 000 prescriptions studied in connection with this present report were placed at the disposal of Dr. E. N. Gathercoal, Chairman, National Formulary Revision Committee, to be used as part of the material forming the basis of "The Prescription Ingredient Survey," also known as the U S P-N F Prescription Survey. This survey was conducted by Dr. Gathercoal under the auspices of the boards of trustees of the United States Pharmacopeia, the National Formulary and the AMERICAN PHARMACEUTICAL ASSOCIATION. The Survey has been based upon prescriptions carefully selected from professional and commercial type pharmacies located in New York, California and Maryland as well as the approximately 35 000 prescriptions from Missouri mentioned above.

The primary purpose of the U S P-N F Prescription Survey is to furnish information

to the U S P and N F Revision Committees concerning the extent of use of various medicines prescribed by physicians. Thus its purpose differs somewhat from the primary purpose of the National Drug Store Survey, which is attempting to throw light on the economic loss due to the excessive cost of handling innumerable slow-moving prescription items, and to present certain facts to aid in prescription department stock simplification in an endeavor to increase efficiency of operation and net profits. Nevertheless, some of the facts from the Missouri section of the U S P-N F Prescription Survey contain both commercial and scientific interest and are here-with briefly summarized. Incidentally, the number of prescriptions contained in this summary slightly exceed the number used in the two reports from the National Drug Store Survey. Also a few inconsistencies may appear due to the fact that the committee of the U S P N F Prescription Survey definitely decided to follow the plan used in the Charters Report and included trade-marked brand names of definite chemical substances and galenical preparations as an indent under the chemical or pharmacopœial name of the substance, and counted the occurrences under the brand name in those recorded for the chemical.

The following table shows that 342 out of the 1778 different items occurred over 10 times each. Of these 175 items (51 per cent) were U S P X, 34 items (10 per cent) were N F V and 86 items (25 per cent) were manufacturers' specialties. Thus only 25 per cent of the items of frequent use were specialties, while official and unofficial items (many of the latter being of a semi-official character) accounted for 75 per cent of these fast moving items.

Official and unofficial items represented 65.30 per cent of the 1778 different items and 83.80 per cent of the total number of occurrences of ingredients. Specialty items accounted for 34.70 per cent of the 1778 items but only 16.20 per cent of the total number of times the ingredients were used. The important factor in profit possibilities is not the number of different items called for, but the number of times the items are used. The actual use of U S P X items was greater than that of any of the other three types of items. There were 175 U S P X items which occurred over 10 times each, these 175 items being used an average of 85 times each per 10,000 prescriptions. N F V was represented with 34 items occurring over 10 times each with an average occurrence of 40 times each, per 10,000 prescriptions. There were 47 unofficial items occurring over 10 times each and they were prescribed an average of 31 times each per 10,000 prescriptions. Specialty items in this fast-movement group numbered 86, with an average occurrence of 32 times each per 10,000 prescriptions. Thus it is seen that specialty items of frequent occurrence were not prescribed anywhere near as frequently as official U S P and N F items. On the other hand, as a glance at the table will show, specialties are responsible for more items of infrequent occurrence, calls or sales than U S P and N F items combined.

It might be remarked that the Missouri section of the U S P-N F Prescription Survey stood particularly high in the percentage of U S P and N F items used.

An examination of the super list of ingredients occurring 10 times or more per 10,000 prescriptions in the "Prescription Ingredient Survey," drawn from a total of nearly 122,000 prescriptions (including the 35,000 from the National Drug Store Survey in Missouri), revealed that out of 701 different ingredients occurring 10 times or more each 170 were chemicals, 276 were galenicals, 227 were specialties and 28 were botanicals, oils, etc. The 122,000 prescriptions were drawn from the four states of California, Maryland, Missouri and New York. Only 256 or 36.5 per cent of the 701 items occurring 10 times or more each, occurred in all four states represented. Of these outstanding 256 items, 88 (34.4 per cent) were chemicals, 103 (40.2 per cent) were galenicals, 52 (20.3 per cent) were specialties and 13 (5.1 per cent) were botanicals, oils, etc. Those of the 256 outstanding items which are published in the preceding lists of leading ingredients are indicated by a foot note mark (foot-note one). Of course, the lists printed herein only show chemicals, galenicals and botanicals, oils, etc., specialties having been omitted for reasons previously given.

The number of ingredients occurring 10 times or more each in 10,000 prescriptions in the different states were as follows: California, 340, Maryland 311, Missouri (professional pharmacies) 308, Missouri (commercial type pharmacies), 348, and New York, 366. A composite list of these leading items for the four states contained a total of 701 different items. Some idea of the wide difference between the leading ingredients of one state as compared with those in other states may be gained by reference to the following table. It will be noted that each state group had from 90 to 182 ingredients which did not occur ten times or more in some other state.

TABLE XLII — DATA FROM THE MISSOURI SECTION OF THE PRESCRIPTION INGREDIENT SURVEY <sup>1</sup>

Type of Ingredient.	Number of Different Ingredients	Per Cent of Total	Total Occurrences	Per Cent of Total
U S P X Items	439	24.69	54,305	67.31
N F V Items	224	12.60	6,025	7.45
Unofficial Items	498	28.01	7,298	9.04
Specialty Items	617	34.70	13,046	16.20
Total	1778	100.00	80,674	100.00

Type of Ingredient.	Occurrences per 10 000 Prescriptions	Number of Different Ingredients	Total Occurrences per 10 000 Prescriptions
U S P X Items	Under 1	107	50.57
	1 to 10	157	564.46
	Over 10	175	14,829.06
	Total	439	15,444.09
N F V Items	Under 1	105	50.29
	1 to 10	85	295.09
	Over 10	34	1,713.44
	Total	224	2,058.82
Unofficial Items	Under 1	277	113.80
	1 to 10	174	513.77
	Over 10	47	1,447.60
	Total	498	2,075.17
Specialty Items	Under 1	279	124.04
	1 to 10	252	868.93
	Over 10	86	2,716.56
	Total	617	3,701.53
All Items	Under 1	768	338.70
	1 to 10	668	2,242.25
	Over 10	342	20,361.28
	Total	1778	22,942.23

NOTES 1 The average number of ingredients per prescription is 2.29

2 The 439 U S P items are 70.2 per cent of the 621 items monographed in U S P X

3 The 224 N F items are 30 per cent of the 758 items monographed in N F V

<sup>1</sup> Results from tabulation of ingredients in 35,163 prescriptions from professional and commercial type pharmacies

studied. It is of special interest to note that 90 of the leading ingredients from the Missouri commercial type store did not appear in the Missouri professional pharmacy list, while 117 of the Missouri professional pharmacy ingredients did not appear in the Missouri commercial type store list. The leading ingredients in the Missouri commercial type stores appeared in other state lists more than any other group, while New York led in ingredients which failed to appear in the lists of other states.

TABLE XLIII—EXTENT TO WHICH THE LEADING INGREDIENTS OF ONE STATE ARE FOUND TO BE LEADING INGREDIENTS IN OTHER STATES <sup>1</sup>

State	Number of Leading Ingredients	Number of Leading Ingredients Not Occurring in—				
		California	Maryland	Missouri Commercial.	Missouri Professional	New York
California	340		99	167	156	108
Maryland	311	147		161	149	113
Missouri (Commercial)	348	163	113		90	132
Missouri (Professional)	308	182	129	117		167
New York	386	152	107	178	171	

<sup>1</sup> A "leading ingredient" is one which occurred 10 times or more per 10,000 prescriptions in any one state

#### WHOLESALE STUDY SHOWS PRESCRIPTION ITEMS YIELD NET PROFIT

The study covering the wholesale phase of the National Drug Store Survey is about ready for publication by the Bureau of Foreign and Domestic Commerce. Preliminary figures from this wholesale study show that prescription items handled by the service wholesaler yield a net profit in spite of heavy investment and storage charges resulting from the inherent slow turnover of prescription items. This finding is quite interesting in view of the fact that some other departments with comparatively high turnover do not yield sufficient gross margin to cover their operating expense, and thus show a net loss.

#### ABSTRACTS OF SCIENTIFIC SECTION PAPERS

"Licorice Fern and Wild Licorice as Substitutes for Licorice," by Louis Fischer and E V Lynn—A study reported by one of the authors three years ago indicated the possibility of using the rhizomes of licorice fern, *Polypodium vulgare* L. var. *occidentale* Hook., in place of the official licorice. In the meantime, attention was called also to the common occurrence of *Glycyrrhiza lepidota* (Nutt.) Pursh. Both plants have now been examined carefully. No glycyrrhizin could be found in the rhizomes of either plant, in spite of previous impressions to the contrary and of the fact that the results of quantitative methods appear to indicate its presence. From the leaves of licorice fern were extracted benzoic acid, sucrose, a phytosterol, an indifferent substance (carbon 80.65 and hydrogen 12.80 per cent) melting at 74° C., and probably salicylic acid besides the usual starch, proteins, etc. From the rhizomes of wild licorice were identified sucrose and benzoic acid. The characteristic taste of the rhizomes from licorice fern is due partly to sucrose, which was identified, and partly to a bitter substance in very small quantity. They contain also a glucoside which was given the name, "polydin," but no alkaloids.

By a preliminary extraction with chloroform, galenicals can be made from the rhizomes which are satisfactory substitutes for those made from licorice. The taste is strikingly similar. Experiments in cultivation have indicated that commercial production to economic advantage is very possible.

"The Value of Senecio in Medicine," by Edgar A. Kelly and E V Lynn—In a preliminary examination reported two years ago, the presence of alkaloids in *Senecio aureus* was noted. Since then we have submitted the official material to very careful study and have come to the conclusion that, if alkaloids are contained, the amount cannot be over 0.0007 per cent. No evidence could be obtained for the presence of glucosides and none for any toxicity to rats or rabbits, even with doses up to 170 times that given in the formulary as average. The starch of senecio is practically, if not entirely, inulin quantitatively about 10 per cent. Numerous experiments on isolated uterine strips and on normal uterine movements *in vivo* demonstrated the absence of any effect on tone, rate or amplitude.

The authors are now, therefore, inevitably forced to the conclusion that senecio presents no useful properties as medicine. The published recommendations are for uterine stimulation, or at least effect on the uterus, and the authors can find no evidence whatsoever for any such action; they suggest that the material be eliminated from our materia medica. As long as certain classes prescribe it, deletion from the Formulary may not be advisable, but it would seem logical to urge abandonment of any administration.



## PROCEEDINGS OF THE LOCAL BRANCHES

'All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council'

—Part of Chapter VI Article VI of the By-Laws

ARTICLE III of Chapter VII reads "The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body, and the acts of local branches shall in no way commit or bind this Association, and can only serve as recommendations to it And no local branch shall enact any article of Constitution or By-Law to conflict with the Constitution or By-Laws of this Association"

ARTICLE IV of Chapter VII reads 'Each local branch having not less than 50 dues-paid members of the Association, holding not less than six meetings annually with an attendance of not less than 9 members at each meeting, and the proceedings of which shall have been submitted to the JOURNAL for publication may elect one representative to the House of Delegates'

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting, if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

### BALTIMORE

The first fall meeting of the Baltimore Branch A Ph A was held at the Hotel Emerson on Wednesday, October 4, 1933 The meeting was opened with President Solomon, the secretary gave a report of the business of the Branch since the last meeting and read the resolutions passed by the Parent Association at the Madison meeting The following were elected to membership Irving Fried Morris Harris, Gus Kroopnick, Frank C Purdum, Thomas G Wright and Medford C Wood The resolutions and reports of the AMERICAN PHARMACEUTICAL ASSOCIATION as read by the secretary were commented on by Mr Eberle

President R L Swain, of the A Ph A, the chief speaker of the evening, was introduced by President Solomon Dr Swain's topic was 'Pharmacy under the National Recovery Act' The purpose and scope of the NRA and the constitutionality of the act were discussed in a preliminary manner He then told how the General Code and the Pharmacists special Code were drawn up He outlined the many difficulties encountered in obtaining a satisfactory Pharmaceutical Code Dr Swain discussed many of the peculiar features of the Drug Code, including the fifty-six-hour week and the \$16 minimum wage He next discussed the price protection features of the code pointing out the necessity of obtaining some system to control prices of retail goods Many unfair trade practices of drug stores as discussed in Washington were related by Dr Swain, who pointed out that many

other retail dealers are bitter against the Retail Drug Stores, an unfortunate result of trade associations which will lead to many unhappy conditions

Dr Swain's talk was discussed by the members present and President Solomon then called upon Mr Kantner, a delegate to the N A R D Convention, for a report Mr Kantner reported that little hope could be given the supporters of the move to combine the two major associations, this year at least Mr Jackson and Mr Meyers also commented upon the reports

The meeting was very well attended, about thirty five members were present A note of thanks is extended to those who took part in the discussions of the meeting

C JELLEFF CARR, *Secretary Treasurer*

### STUDENT BRANCH, UNIVERSITY OF FLORIDA

The Student Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION had its first meeting of the year on October 9, 1933 President George R Jones opened the meeting with a short talk greeting the members and others who were present The principal speakers of the evening were Drs P A Foote and B V Christensen Dr Foote talked on "The Meaning of Pharmacy Week" emphasizing its significance Dr Christensen spoke on the history of the association and the privileges and benefits derived from it Another speaker, H J

Lynch, graduate student and chairman of the Window Display Committee for "Pharmacy Week" outlined his plans for displays in local drug stores Motion for adjournment was made and approved  
G C SPARKS, *Secretary*

### REMINGTON MEDAL PRESENTATION HONORING EVANDER F KELLY

The services of Evander F Kelly in local, state and national association work are well and favorably known, and also his constant attention to all matters pertaining to the advancement of pharmacy, and alertness regarding its interests, readiness to speak in its behalf and directing the policies and activities of the AMERICAN PHARMACEUTICAL ASSOCIATION These efforts, his co-operative helpfulness his influence in education applying to pharmaceutical promotion, his direction in Association affairs, were brought out in the brief addresses at the ceremonial of the Remington Medal award in New York City on October 11th

Preceding the formalities of the award a dinner was given at Pythian Hall, which was attended by a large number of friends, aside from New York City and vicinity, many attended from Baltimore and nearby cities The fact that all members of Dr Kelly's family were present added greatly to the happy event Congratulatory letters and telegrams came from Great Britain, Cuba, Porto Rico and all parts of the United States The dinner and ceremonies of the award were under the auspices of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION The officers of the New York Branch are *President*, Ernst A Bilhuber, *First Vice President*, Charles W Ballard, *Secretary*, Rudolph O Hauck, *Treasurer*, Turner F Currens, *Remington Medal Committee Secretary*, Hugo H Schaefer *Reception Committee* Ernest Little, James H Kidder, William C Anderson John L Dandreaux, C Jelleff Carr, Edmund H McLaughlin



E F Kelly, Remington Medalist, 1933



Inscription on Remington Medal



Joseph P Remington—Face of Medal

President Ernst A Bilhuber welcomed the visitors at the dinner and made the introductory remarks at the ceremonial, in which he happily referred to the pleasure given the members of New York Branch by this occasion In his introductory, he referred to the qualities of the guest of honor, which had influenced the Committee in the election of the medalist for 1933

President R L Swain, of the AMERICAN PHARMACEUTICAL ASSOCIATION, was introduced and spoke of the recipient as "The Educator" His acquaintance with Dr Kelly, dating back to college days and the relations with him in educational matters since that time, qualified him to speak with authority on this subject, and he did so feelingly and interestingly He impressed, with examples and experiences, the ideals of a teacher he delighted in honoring and the value of his methods in teaching and the influence in educational matters relating to pharmacy He referred to activities during many years which had promoted and advanced pharmaceutical education

Dr Henry A B Dunning was next introduced He had made notes on Association activities of the medalist that covered quite a number of pages and to speak of them would require more time than at his disposal for the subject Kelly the Association Man He referred briefly to his work on the Pharmacopœia and the National Formulary, his part in surveys, on the codes,

in Public Health Service, State and National Associations, his directing influence and secretarial capacities

The speaker gave more time in impressing the importance of his work on the Headquarters which had now been brought to realization. He gladly gave much credit to the medalist for his own work, the problems in connection therewith he had solved by good judgment, tact and sound reasoning, presented in a convincing way. Difficulties that at times were seemingly unsurmountable had been overcome by him and several who were for a time opposed were persuaded to accept his views and cooperated. The experiences during the years in which problems relating to the site and building were dealt with had not only resulted in success, but those whose support was needed became friends, supporters and co workers. Reference to the former reports on the Headquarters made by Chairman Dunning will reveal and emphasize other remarks of the speaker and extend beyond the lines of this brief report.

Dr S L Hilton who spoke of the "medalist as co-worker," in a happy vein, referred to some experiences which exemplified the co worker, how by his consideration for the work of others he gained their support. His association with Dr Kelly extended over a period of many years and he never had failed in giving counsel and his advice was always helpful. He referred to his association with him in revision work and in that for the ASSOCIATION. During the past years in the earlier efforts for the Headquarters and during the construction of the building he had been in almost daily contact, and his appreciation of him as a co worker had grown. Several stories, well told, were illustrative of the quiet manner in which he presented his argument and gave information.

The subject of the next speaker, E G Eberle, was "Kelly, the Associate and Friend." He gave from his experience during the years of association the traits and qualities which were impressed on him—thoughtful in his judgment, careful in his counsel, considerate of those he came in contact with. The speaker is deeply appreciative of the friendship made. The writer will not quote at greater length at this time, for the report of the New York Branch will probably give more detail presented in the addresses. The quotations from the medalist's address will also be very brief at this time.

In responding Dr Kelly spoke of his connection with pharmacy and his association with outstanding pharmacists, and he referred specifically to such leaders as Caspari, Simon, Culbreth, Hynson, Base, Schmidt, Piquett, the Dohmes, Hancock, Elliott, Mansfield, Frames. He conveyed his ideals of pharmacy in speaking of the profession and its service and importance. His survey of pharmacy and its activities, though brief, were comprehensive. He dealt with phases of pharmacy and its standing, its opportunities, and referred to difficulties that need constant watchfulness so that its service may not be impaired. He spoke of pharmaceutical education and advancement, its professional recognition, the activities which had promoted and strengthened its importance, and of the large part the AMERICAN PHARMACEUTICAL ASSOCIATION had in these activities, the value of the American Institute of Pharmacy for pharmacy and in public health matters.

The medalist expressed his loyalty to pharmacy—he said "Pharmacy has been a kind and considerate professional mistress to me. It has given me the opportunity to live a full life in a worth while calling. It has honored me and I have thoroughly enjoyed life."

Past President Dr Otto Raubenheimer, of the New York Branch, in well chosen words, expressive of regard and esteem, presented the Medal, preceding the address of the medalist.

Following the close of the ceremonies the friends in attendance congratulated the recipient and family and gave expression of their pleasure and enjoyment of the occasion.

---

#### PHARMACY NIGHT AT UNIVERSITY OF BUFFALO

More than 1400 guests, most of them not connected with the profession, attended the Fourth Annual Pharmacy Night at the University of Buffalo, School of Pharmacy, October 13th. Each year the University of Buffalo coöperates in presenting to the public information relative to the service of pharmacy. This is part of Pharmacy Week program—members of the staff spoke at high schools, luncheon clubs and on the radio. Articles in newspapers impressed the public with the professional aspects of pharmacy and exhibits of the school were enhanced by work carried on in the laboratories, displays, demonstrations etc.

# THE EIGHTY-FIRST ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, MADISON, WIS., AUGUST 28-SEPTEMBER 2, 1933

## ABSTRACTS OF THE MINUTES OF THE GENERAL SESSIONS

The sessions of the Eighty-First Annual Meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION were held in Hotel Loraine, Madison, Wis. A partial list of members will be found on page 927 of the September JOURNAL and a continuation of the list in this issue, October, of the JOURNAL.

Some of the Committee Reports referred to in the Proceedings have been printed in the Council Minutes, on pages 902 to 919 of the September number, some are included in these minutes or will be printed in later issues of the JOURNAL under 'Committee Reports' or under Addresses."

### FIRST GENERAL SESSION

The First General Session of the Eighty-First Annual Meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION was called to order by President W. Bruce Philip at 9 00 A M., Wednesday, August 30, 1933, in Hotel Loraine. President Philip invited the former presidents of the ASSOCIATION and the honorary presidents to seats on the platform in the order of their seniority. Of those present they are: Eugene G. Eberle, William B. Day, A. R. L. Dohme, S. L. Hilton, Julius A. Koch, H. V. Arny, L. L. Walton, T. J. Bradley, D. F. Jones, H. A. B. Dunning, H. C. Christensen, Walter D. Adams, and former *Honorary President*, Louis Emanuel. The officials of other organizations were invited to seats on the platform and also the officers of the AMERICAN PHARMACEUTICAL ASSOCIATION.

On account of illness, former President C. W. Johnson had to return home before reaching Madison.

The President called for the report of the House of Delegates which was presented by Chairman J. W. Slocum. On motion duly seconded it was approved. (The Minutes of the House of Delegates will not be reprinted in the minutes of the General Sessions as they would duplicate the minutes of the House of Delegates.)

The next order of business was the reading of the President's Address. It is printed in the September number of the JOURNAL, pages 851 to 860. Actions on the President's Address are embodied in the Resolutions on page 879 of the same issue of the JOURNAL. During the reading of the President's Address, First Vice-President Rowland Jones presided. The address of the President was referred to the Committee on Resolutions, in accordance with the By-Laws.

Under the head of new business, Secretary Kelly submitted a written motion to amend Section A of Article 1 of Chapter V of the By-Laws of the ASSOCIATION to provide representation in the House of Delegates for the National Conference on Pharmaceutical Research. This motion was laid over for action at the next General Session.

Secretary Kelly read communications from the senior member and senior past president, John Uri Lloyd, life-member, Sir Henry S. Wellcome, chairman of the British Pharmaceutical Conference, Herbert Skinner, of London, Dr. R. B. J. Stanbury, secretary Canadian Pharmaceutical Association, Dr. Olin West of the American Medical Association, Dr. Wm. A. Pusey, Dr. Eben J. Carey, Rufus C. Dawes, president of A Century of Progress, former President and Mrs. Charles H. LaWall, Mrs. John G. Godding, Mrs. A. R. Bliss, Jr., President John A. Goode, N. A. R. D., California Pharmaceutical Association, Oklahoma Board of Pharmacy, West Virginia Pharmaceutical Association, A. G. Whiteside, Deputy Administrator, NRA, Samuel S. Dworkin. Secretary Kelly asked that these messages be entered into the records of the meeting and it was so ordered. They follow:

### MESSAGES

To one and all I extend cordial greetings with best wishes for a successful meeting from every standpoint. My unavoidable absence is much regretted, especially sorry to miss the past presidents' dinner. Hoping to be with you next year, I am, sincerely yours—JOHN URI LLOYD

As a Life Member of the AMERICAN PHARMACEUTICAL ASSOCIATION, I very deeply regret that it is impossible for me to attend the Annual Meeting this year, especially having regard to the important connection of our distinguished fellow member, the late Fredrick B Power, LL D, Ph D, with the University of Wisconsin

'It was Dr Power, having already gained renown in the field of chemical and pharmaceutical research who organized the pharmaceutical department of the University at Madison The high scientific standards and ethics which he established are, I understand, being fully maintained by the present Director

Please convey to the President, the Council and Members of the AMERICAN PHARMACEUTICAL ASSOCIATION, my cordial greetings and best wishes for a successful meeting"—Yours sincerely, HENRY S. WELLCOME

Success to conference '—SKINNER London, England

'Canadian Pharmaceutical Association sends greetings to the AMERICAN PHARMACEUTICAL ASSOCIATION We recall our delightful conference in Toronto last year and trust as a result of your present deliberations great benefit may accrue to the druggists of the United States"—R B J STANBURY *Secretary*

Regret very much neither Doctor Leech nor I can go to Madison to morrow because of tremendous press of work '—OLIN WEST

Your annual meeting affords occasion to congratulate you on your splendid exhibit at A Century of Progress"—RUFUS C DAWES President of A Century of Progress, DR WILLIAM ALLEN PUSEY Chairman of Medical Advisory Committee, DR EBEN J CAREY, in charge of Medical Section

We both send greetings to the AMERICAN PHARMACEUTICAL ASSOCIATION and hope that our great organization will rise to new levels of efficiency under the successive administrations of Presidents Philip and Swain We regret that we cannot be with you but we hope to join you next year '—CHARLES H LAWALL and MILLCENT R LAWALL

"Hearty greetings to the AMERICAN PHARMACEUTICAL ASSOCIATION in convention assembled Keen regret I cannot be present Best wishes for a very successful meeting loyally"—MRS JOHN G GODDING

'We got as far as Chicago where Doctor Bliss became suddenly ill and consequently much to our disappointment we are forced to return to Memphis Please convey greeting of Doctor Bliss and his regrets to the AMERICAN PHARMACEUTICAL ASSOCIATION '—MRS A R BLISS JR

'The officers of the National Association of Retail Druggists extend greetings and best wishes to your ASSOCIATION and pledge their fullest cooperation to its deliberations for the material and professional betterment of its membership I sincerely regret my inability to be in attendance As a last word from Washington may I say that a conference has been set for next Wednesday at which time I am in hopes progress will be made on our Code We are encouraged to believe that our proposal on hours and wages will be accepted Dr Swain will be with you and give a more complete report Regards to all"—J A GOODE, *President*

Extend greetings and best wishes of the California Pharmaceutical for a most successful convention Trusting to see you all at the N A R D in September"—EDNA E GLEASON, *President*

"Will not be able to attend the convention on account of having the flu A successful convention and much good may be accomplished is the wish of your friend"—C M BREWER *Secretary, Board of Pharmacy*

'Greetings from the smallest Pharmaceutical Association to the largest Adding our invitation to that of the Hotel Greenbrier to choose this as your meeting place next year"—G B MERRIAM, *Secretary*

'I have received your telegram and it will be given immediate consideration personal'—  
A. D. WHITESIDE, Deputy Administrator

Only few days ago at the hearing of the druggists' Code general denial was registered by many that Pharmacy is a profession, what a tragedy. The hope of the true pharmacists is in you to eradicate this mistake of classification. First let us make ourselves pharmacy conscious. Wishing you a most successful convention"—SAMUEL S. DWORKIN

It was brought to the attention of the ASSOCIATION that former President Dr. C. W. Johnson, who had started for this convention, had to discontinue his trip on account of serious illness.

President Philip announced that the report of the Committee on Headquarters Building would be made by Chairman H. A. B. Dunning.

Dr. Dunning stated that this was his tenth report. He displayed pictures of the Headquarters site and building, from the ground breaking up to the present, and also showed drawings of the ground and landscaping. He interspersed his remarks with references to the amounts contributed and further requirements needed. The report follows.

#### REPORT OF THE COMMITTEES ON THE HEADQUARTERS BUILDING, JULY 31, 1933

Those to whom was intrusted the responsibility of securing the funds for and erecting the Headquarters Building are very pleased, indeed, to report that the project is now an accomplished fact. The building is practically completed and will soon be ready for the property of the ASSOCIATION to be moved into it. The plans for landscaping and grading have been approved and bids on the work have been invited; it should be completed during October. Part of the furniture has been ordered and all now required will be installed in November. All questions about property have been adjusted and the deeds are now being prepared for signature. (See Council Letter in this issue of the JOURNAL.)

It is planned to have the building occupied and in operation by the first of the coming year and plans can now be definitely made for the dedication exercises.

Although it has necessarily involved sacrifices of time, thought and labor for many and particularly for those who have had to conduct the tedious negotiations and direct the project, it has been a splendid experience and we feel entirely satisfied with the final result, as the first unit in what will, in time, become a great institution of credit to our calling and of real service to the people of America.

No effort to describe the building and its surroundings can do them justice. Photographs can impart but an idea of the beauty of the building or of its wonderful setting. Our architect has conceived a gem of a building, one of unique design and material and eminently suited to its location and purpose. The builders have carried the plans into execution with great skill and fidelity. The landscape architect has provided a setting appropriate as to simplicity with the building itself, and designed to bring out its peculiar beauty. Those who are furnishing the building are doing their part in carrying out a plan of creating here an effect in full keeping with the magnificent surroundings. We owe a great deal to those who have given us such a beautiful and serviceable structure and especially to Mr. John Russell Pope and his associates, who have not only designed the building and supervised its construction but have also cooperated in the landscape plans and furnishing so that there should be harmony in the final result.

We are confident that all those who see the building will understand its purpose. It is intended to express pharmacy and its service, to acquaint the people and government officials with the important work which pharmacy does as a public health profession. It is difficult to estimate the effect which such an institution can exercise on public thought as the years go by, because of its location it will increase in this influence so long as our Government continues.

It is surrounded by institutions with which ours should develop close contact, the National Academy of Sciences, the National Research Council, the Public Health Service, the National Institute of Health and the great Naval Hospital. Other governmental and semi-governmental institutions and departments with which pharmacy must cooperate are nearby. It is at the junction of the two main arteries of traffic for the thousands and thousands of people who visit this area annually.

The project has already stimulated interest in and support of the work being done to

advance pharmacy and to place it on the proper basis, and has improved the public and official attitude toward our profession

Very few changes have been found necessary in the contract for erecting the building and to date the total cost is less than the contract cost. It was necessary to use marble and we were fortunate to obtain a selected lot of Imperial Danby Marble at a very reasonable cost. The result is very satisfactory in every respect. The settlement of the area of land to be deeded to the ASSOCIATION under Public Resolution No. 18 required a number of conferences but was finally adjusted satisfactorily. A sufficient area to protect our building has been deeded to the ASSOCIATION and we have been given the use of the park area between our property and Constitution Avenue on the same terms as the National Academy of Sciences in the adjoining square to the east. This arrangement provides a splendid approach to the building and frontage on one of the most important avenues in Washington.

The landscape and planting plans have also required a great deal of time and thought. Mr. A. F. Brinckerhoff, of New York, was chosen to cooperate with Mr. Pope in developing the plans and in supervising the grading and planting. After many changes the plans were approved and the work will be completed this Fall.

The plans for furnishing the building have not been completed nor approved. The desire is to select a simple style of furniture in thorough keeping with the building and which can be added to from time to time, as required. It will thus be possible to install—at this time—only the furniture required and to purchase additional pieces as found necessary. Mr. Pope is assisting also in selecting the most suitable type of furniture.

This plan will enable us to place in the museum, the library and the offices such exhibits, books and equipment as will make them serviceable, and to add to this slowly and with time to give careful thought to each selection.

The Committee on the Procter Memorial are cooperating with us and the tentative plan is to place the statue of Procter in the entrance hall of the building. If this plan is carried out, the statue will be a splendid addition to the building. The architect suggested the placing of about twenty names of prominent pharmacists, co-temporary with or prior to Procter, in panels on the walls of the hall. This was not done as it is too early to make such decisions. It is believed to be too early to even decide upon the form of acknowledging the assistance of those who contributed to the fund for erecting the building. All such questions should be given extended consideration after the building is occupied.

Three State associations have contributed special funds for designated purposes. The Texas Pharmaceutical Association for furnishing the offices of the Editor, the Maryland Pharmaceutical Association for furnishing the offices of the Secretary and the Kansas Pharmaceutical Association have not as yet decided for what their fund is to be used. Suitable acknowledgment will be made of these splendid contributions and it is hoped that the other state associations will make contributions for special purposes, thus emphasizing the close relations between them and the AMERICAN PHARMACEUTICAL ASSOCIATION and associating the name of each of them with the project.

The next step before us is to bring the scattered activities of the ASSOCIATION and its related organizations together in the building and to coordinate them as far as possible. We must develop a worth-while historical museum and reference library and make them of service to pharmacy. We must secure such endowment as is necessary and an increased membership so that the work of the ASSOCIATION can be extended.

As previously reported, the research laboratories, chemical, physical and biological, will be housed in a separate building which has been provided for and which will be erected as soon as the present building can be occupied and the questions in connection with it settled. The general plans for the laboratory building are already under consideration.

We now have ready for occupancy and use the first unit of an institution which will, we believe, develop rapidly and will become the real headquarters of professional pharmacy in this country. This unit is a credit to the ASSOCIATION and to all those who have cooperated in providing it. It illustrates what it is possible for pharmacy to do and should stimulate all of us to see that our profession is provided with such a home as is appropriate to its purposes and as will enable it to function most effectively for the American people and American pharmacists.

Chairman Walter D. Adams asked those on the Nomination Committee to attend a meeting immediately after the adjournment of the General Session.

President Philip asked the Chairman of the Council, Dr S L Hilton, whether he would like to make some further remarks relative to the Headquarters Building

Dr Hilton stated that he had made almost daily visits to the Headquarters site and building. He referred to the many difficulties that Chairman Dunning and Secretary Kelly had met with and overcome. There had been considerable delay on account of legislative matters. The building is resting on a rock of the same strata that the Lincoln Memorial rests on. The building is now ready for occupancy and the grading and landscaping in front of the building will be started shortly. (See also Council Letter in this issue.) He referred to favorable publicity which had appeared in the past and this evidenced that more will be given. He knew that it will be a great relief for Secretary Kelly and Editor Eberle to have a place where they can carry on the work of the ASSOCIATION without the discomfort of the present office.

Chairman Dunning stated that he did not emphasize or go into detail regarding the men who had aided the working Committee in this undertaking but he would have a serious qualm of conscience if he did not make it clear that much of the responsibility of the burdensome and heart-breaking times that have been borne by the Chairman and his Committee during the past years has been carried on the shoulders of Secretary Kelly.

President Philip called on Secretary Kelly, who said it was needless to assure the members of his interest in this undertaking and the great satisfaction he has in the fact that it is so near completion. While it has taken a great deal of time, he wished to give assurance that it has been a labor of love for all. He referred to a remark Chairman Dunning made some time ago when viewing the building, which he thought illustrated the devotion and thought that has been put into this project by him and that was 'He would probably take more satisfaction from this effort and endeavor than anything else he had done in his life.'

Secretary Kelly proceeded by saying that the building typifies or represents to the people that pharmacy is an important vocation in life and has an important work to do, thus President Philip had well expressed in his address. He said a million or more people visit the Lincoln Memorial annually and every one who visits this area is bound to be impressed by a building of the type of the Headquarters. He stated that Dr Dunning had referred to the consideration of economy in the erection of the building as well as of the up keep. The building has no elevator, the heat is automatic and requires no attention. In other words every effort has been made to hold down expenses. He stated that Editor Eberle and he and others privileged to work in this structure are looking forward with a great deal of pleasure and sincere appreciation to those who have made it possible. The Headquarters should be a central point for professional pharmacy in this country and he believed that many avenues of effort such as this laboratory building Chairman Dunning had spoken of will be opened up as soon as people realize that American Pharmacy has a home and that these projects can be brought together and promoted. He thought that there would be many developments from this building that are unknown to even those who have been so intimately associated with it. This building will place pharmacy permanently before the people—the laboratory building has come out of just such an idea. When the building was first designed it was intended to have a small chemical laboratory. He could assure the governmental agencies that it is a unit in a large institution which will develop there.

Secretary Kelly concluded by saying that it had been a real pleasure to work with Chairman Dunning and those who have given such splendid assistance in this building and to the governmental agencies who appreciate what pharmacy is endeavoring to do and the very finest support has been given. He realized that a word of thanks would not be complete without saying that every person who has given the smallest amount of money to this project has made a contribution to a fine effort.

President Philip stated that all members who have the opportunity should visit the building and invite men of prominence and others to see the building with them.

President Philip then introduced Dr W G Campbell, Chief of the Food and Drug Administration U S Department of Agriculture. He spoke on the proposed revision of the Food and Drugs Act. The address follows.

#### THE BILL TO REVISE THE FOOD AND DRUGS ACT

An address delivered before the AMERICAN PHARMACEUTICAL ASSOCIATION at Madison Wisconsin August 30 1933, by W G Campbell Chief Food and Drug Administration U S Department of Agriculture



Time, with its changes, has proven the value of the Federal Food and Drugs Act, but it has also demonstrated its limitations. In that law the definition of drug is too restrictive. There is no provision for legal food standards. Adequate penalties are lacking. These deficiencies were as real a quarter century ago as they are to day. At various times they have been the subject of comment by administrative officials seeking legislative correction. Both public service and industrial experience have proven the need for amendments to this law designed for the protection alike of the public and the honest manufacturer, but characterized by these and similar fundamental omissions. Not all the abuses, however, to be found in the present-day methods of marketing food and drugs are as old as the statute. Developments of recent years have produced their crop of marketing innovations by which the public may be stung and competition stifled. Jurisdiction over collateral representations and the requirement of informative labeling are imperative if some of the most vicious current abuses are to be eradicated.

The authors of the law could not have seen in 1906 and previously that the regulation of advertising was essential to the promotion of honesty and fair dealing in the sale of food and drug products. Originally the label was its own advertisement for these commodities. The last generation remembers well the list without number of drug products with slight, if any therapeutic value branded as treatments or cures for cancer, tuberculosis, syphilis and other serious diseases. With the advent of a statute prohibiting on labels false statements fraudulently made, it became necessary, if the sphere of criminality was to be avoided, to provide some other means for the advancement of these misleading, extravagant and untruthful claims. Bill board posters, highly decorative pages of magazines and the columns of the daily press were and are employed. When the radio, that invaluable boon to mankind made its appearance its facilities also were commandeered. Now, when the human voice through this medium can be carried to every home in the land, we listen to the modulated tones of the announcer as he tells us a miraculous story about the healing properties of this medicine or the nutritive value of that food.

It is an interesting and amazing fact that offenders frequently frustrate their own plans. If quick to seize a popular development adapted to the furtherance of their program, the greedy will in all probability use it with sufficient intemperance to effect their own undoing. That, precisely, is what is happening in the radio advertising of certain foods and drugs. It is impossible to mistake the popular adverse reaction. At first interested, perhaps beguiled, the public listens to the fantastic claims made for these products. As the truth which invariably attends extensive publicizing gradually becomes known, interest gives way to suspicion which is, in turn supplanted by resentment. But, unfortunately, the enterprise meanwhile becomes a financial success. This trusting, purchasers without number have guaranteed, blissfully ignorant of the fact that they are being defrauded.

Had Congress foreseen that the present skilful high pressure advertising would in large measure annul the requirement for truthful labeling, and that this could be made possible because there was no provision compelling informative label statements, it is reasonably certain that the terms of the law would have dealt adequately with these features. The authors failed to anticipate the commercial trend of things. The initial shortcomings of the Food and Drugs Act of 1906 and the subsequent changes in methods of production and sale operate to give us a law no more suited to current mercantile practices than a vehicle of the same vintage would be to the high speed traffic which to day courses our thoroughfares from one end of the country to the other.

A new bill, Senate 1944, introduced by Senator Copeland in the closing days of the special session of this Congress, undertakes to preserve all of the meritorious features of the existing law and to provide for new legislative authority to deal effectively with those abuses which cannot now be regulated. This measure was drafted at the direction of the President and under the general supervision of the Assistant Secretary of Agriculture. Your interest is in that portion of it which applies to drugs. A satisfactory discussion of it inevitably calls for a comparison with the existing statute. Let's see how the bill would control the production and sale of drugs.

First, may I mention the fact that the bill is not a food and drug measure exclusively. It applies also to cosmetics. It is definitely in the interest of society that cosmetics be subject to regulation. This fact has been recognized for years. The Department of Agriculture has advocated the necessary legislative measures to make this possible. The bulk of cosmetic manufacturers subscribe to such action. A repetition of the well known and much heralded injury caused by the use of 'Koremlu' a depilatory containing thallium acetate, should be prohibited by law.

There are only two requirements for cosmetics under the section defining adulteration. The first is that a cosmetic shall not be injurious to the user under the conditions prescribed in the labeling, and the second is that it shall not contain poisonous or deleterious ingredients in excess of the limits of tolerance prescribed by the Secretary of Agriculture. Cosmetics are subject only to the general misbranding provisions of the bill which proscribe, as does the existing law, the use of any label statement which may be false or misleading. It requires, furthermore, that cosmetics in package form bear the name and place of business of the manufacturer, packer, seller or distributor, and a statement of the quantity of the contents.

The definition of drug in the present law covers, in addition to official products, "any substance or mixture of substances" used in the cure, mitigation or prevention of disease. There is a serious legal question whether this definition includes certain important medical adjuncts, like sutures and surgical dressings. It is certain it does not include devices. There should be no question about the authority to regulate them. Section 2 (b) of the bill makes subject to its requirements "all substances, preparations and devices" to be used in the treatment or prevention of disease.

The succeeding paragraph in the same section extends the definition of drug, for which there is a well-recognized need, to certain products at present subject to no regulation. In the absence of such therapeutic statements on the label as would bring them within the purview of the Sherley Amendment, fat reducers cannot be regulated even though they be composed of highly potent and dangerous drugs such as thyroid extract, the use of which should depend upon expert advice and be under expert observation.

One of the most important features of the new bill is to be found in the definition of adulteration of drugs, Section 4, paragraph (a). This defines a drug as adulterated if it may be dangerous to health under the conditions of use prescribed on the label. This paragraph has no counterpart in the present statute. It may be employed effectively for the protection of the public in such instances as the indiscriminate and unscientific use of radium. Every one remembers the comparatively recent and tragic death of a prominent Pittsburgh man from the excessive consumption of "Radithor," a radium water. Despite warnings against the general use of such products issued on several occasions by the Food and Drug Administration supplemented by similar precautionary expressions from time to time by Federal and State health agencies, the use and consumption of such products is large. There is an inherent danger in all potent drugs. This paragraph will show upon casual consideration that it is not the purpose of the drafters of this measure to impede in any way the legitimate sale of legitimate drug products. It merely imposes upon the manufacturer of such drugs a determination of the conditions of use without danger and the conveyance of such information to the purchasers thereof. This is an observance of that care consistent with public rights and public health. Both the preservation of public health and the avoidance of opprobrium by the industry, constitute an urge for an amendment of the present act in this particular.

The status of the United States Pharmacopœia and National Formulary will not be impaired by this bill. The requirements of these authorities have been emphasized. At present, as you know, drugs must conform only to the standards of strength, quality and purity as determined by the tests provided in these references and then only when they are sold under the identical name recognized therein. The new measure exacts a compliance of products with the United States Pharmacopœia and National Formulary requirements if sold under a name that simulates that by which they are officially recognized. Section 4 will give the effect of law to some of the present advisory provisions of the Pharmacopœia and Formulary. Not only will it be necessary to conform to the standards of strength, quality and purity announced, but to the definition formula and description set forth. When the protection of the consumer and the interest of the drug industry make necessary the expression of certain specifications in the preparation of official products, as is done for instance in the current U S P monograph on bichloride tablets, no argument, I take it, is required in support of the statement that there should be authority to compel the observance of these precautionary provisions.

The new bill carries in slightly different form the provisions in the existing law authorizing the marketing of official products which are at variance with standard requirements. The specific terms of the present act are satisfied when the container bears a plain statement in which the strength, quality and purity of the drug are set forth. In order that such substandard prod-

ucts might not be confounded with the standard product, the Department, by regulation, has undertaken to interpret the word "plainly," as used in Section 7 of the act, to require an affirmative statement that the product is not a U S P or N F article. There is a general observance of this interpretative regulation and the transposition of this requirement from the field of administrative expression to the text of the law will have slight, if any, effect on existing commercial practices.

The bill authorizes the Secretary of Agriculture to provide, as a supplement to Pharmacopœia and National Formulary requirements, tests or methods of assay where none have been prescribed or where those prescribed are found to be insufficient. Full recognition is accorded to the fundamental purpose of the Pharmacopœia and Formulary as texts of acceptable therapeutic agents. It is the responsibility of the Associations by which they are prepared to determine the conditions which should be imposed for an appropriate preservation of integrity and potency. In this it is not the wish of the Department of Agriculture to participate. The enforcement of the law which creates for the U S P and N F a status of legality rests exclusively with the Secretary of Agriculture. This is a duty of which he cannot divest himself in any particular. Experience has shown that in certain emergencies there will be a furtherance of the purposes of the authors of these authorities, and certainly of the spirit of the Food and Drugs Act, if some provision is made for exigent supplementary requirements in the manner provided in this paragraph.

In the second paragraph of Section 7 of the present law, a drug is declared to be adulterated if its strength or purity fall *below* the professed standard or quality under which it is sold. This is an important provision, good as far as it goes. When certain drugs from which definite reaction is expected are administered in instances of emergency fatal consequences may result when they possess only partial potency. Such results, however, are more likely when the potency is excessive and the drug is as we sometimes have found, *above* the standard professed. While no court decision has been rendered on the point, there is a grave question whether the present law covers more than half the territory required for proper protection. In Section 4 (c) of the new measure, variation in strength above as well as below the standard declared is forbidden. The final paragraph of this section, defining additional forms of adulteration of a drug in terms typical of food laws, is a guarantee of the integrity of the product.

The general misbranding provisions apply alike to food, drugs and cosmetics. They forbid, as does the law now, the use of labels that will deceive and mislead. They require the package to show the name and place of business of the manufacturer, packer, seller or distributor. This was suggested at a conference by the Department with representatives of the drug industry before the bill was drafted and was intended to afford better regulation of the operations of itinerant drug vendors. The new requirement for declaration of net content of drugs in package form has been by general practice largely anticipated. A related feature is the subsequently appearing slack pack provision.

Section 8 defines particular forms of misbranding applicable to drugs. The paragraph by which this section is introduced deals with a question which has proven itself in our administrative experience to be troublesome and controversial. The drug industry is aware of the objection which has been repeatedly voiced by the Department of Agriculture to the enumeration of serious diseases on the labels of drug products, unless such products were in fact an effective treatment for such diseases. This position has been maintained despite the protests of manufacturers who asserted frequently that the ingredients of the drug product were those conventionally administered by the medical profession to victims of the diseases in question. Drugs may be prescribed and administered for alleviating effects, but that is not with the promise or expectation that they will exercise any influence on the course of the disease itself. We recognize as fundamental the principle that unadulterated foods and drugs may be marketed under labeling statements which express the truth. But our view is that a medicine which merely gives relief and is put forth as a treatment of a serious perhaps incurable disease, can claim at best to have told no more than half the truth unless it is clearly labeled to show that it is a palliative only.

By far the greater number of all prosecutions for the misbranding of drugs has been developed under the paragraph restricting the character of their remedial claims. You are too familiar with both the legislative and judicial history of the Sherley Amendment to make comment on that provision necessary. You know that the present law requires the Government to

show that the labeling is not only false but is fraudulent. This involves the disclosure of an element of intent. Under the most favorable circumstances the existence of a purpose to defraud is difficult to prove. The Department's long-time advocacy of a modification of this harsh requirement has been characterized as an attempt to create conditions which would make success for the government in future litigation more definitely certain. This is not the case at all. Accepting the repeated assertions of the courts that the law is for the protection of the consumer it becomes necessary, if the public is to benefit by these decrees, that the present illogical and inconsistent situation created by this paragraph be radically remedied. Repeatedly, in the court room, I have witnessed the introduction of overwhelming expert testimony to show the lack of value of the products on trial. Repeatedly unbiased scientific witnesses, whose evidence was not and could not be refuted, have sworn that such products could not make good on their claims to cure. Repeatedly verdicts against the people have been rendered because of the Government's inability to prove that the manufacturer unquestionably possessed full knowledge of that fact.

The sale of a "white hument" as a treatment for tuberculosis, cancer and locomotor ataxia or the sale of an extract of an innocuous weed as a cure for diabetes, could be undertaken only by one wholly ignorant of the most elemental facts about medicine or by one who deliberately embarked upon a campaign to defraud. If such an article were marketed by the latter, that transaction would be in violation of law. In that case the public is protected. If by the former, relying upon local traditions which may ascribe magical properties to the product and believing that the promises held forth were capable of accomplishment by persistent use of it, there is no offense. The product in each case is the same. To the public the result is the same. If protection is contemplated in one instance, why not in the other? The courts have said that a manufacturer of a drug product should have superior knowledge. On no other assumption can his ministrations to the sick be justified. Hasn't the time arrived when we should give unmistakable expression to this requirement?

The second provision of paragraph (a) will eliminate the necessity to show fraud and authorize remedial action in all instances where claims for the curative properties of any medicine are made contrary to the general agreement of medical opinion.

The next two succeeding paragraphs, (b) and (c), relate to the declaration of narcotics and to alcohol ether or chloroform. They are in form and requirement slightly different from those which now obtain.

Paragraph (d) requires on drug products other than disinfectants, for which special provision has been made specific directions for use, with the proviso for exemption in those instances where protection of public health makes it unnecessary.

Paragraph (e) calls for informative labeling. It has its counterpart in the section defining misbranding of foods. In this the necessity for a disclosure of the complete formula is not imposed. Only the name and the quantity of each active ingredient must be given. I am aware of the opposition to formulas disclosures. It is asserted that such information on the label is of slight, if any, value to the consumer and that it requires divulgence of trade secrets. In my conversations with representatives of drug manufacturers I have had the opinion expressed frequently to me that manufacturers stress as a secret and property right not so much the composition of the product, which after all could be determined by competent analysts but the method of preparation. While it is true that a full disclosure of all the ingredients of a drug product may be of no valuable import to all consumers this necessarily will not be always true. Certainly it will be informative to a large percentage of consumers and, on the theory that opportunity for full and complete information should be accorded the purchaser as a right, this requirement in principle should prevail.

Paragraph (f), requiring on products which are marketed under names recognized in or which simulate those recognized in the United States Pharmacopoeia or National Formulary to be packaged and labeled as required by these authoritative texts, is merely supplemental to the terms of the adulteration section relating to official products.

The provisions of paragraph (g) are of special interest to the distributing drug trade particularly the retailer. A federal act based upon the interstate commerce clause of the Constitution, as is the existing law and the one proposed has jurisdiction over interstate transactions only. If a substandard condition rendering a product violative of the provisions of the act is due to deterioration and occurs subsequent to its interstate shipment, no offense has been com-

mitted by the manufacturer or shipper and no criminal action can be directed against him. This constitutional limitation makes the federal law an insufficient and ineffectual measure for complete public protection. How to avoid the consumption of perishable drugs whose potency has diminished or disappeared is a problem which has presented innumerable administrative difficulties. The marketing of ether is an illustration. Most of the remedial measures against shipments of ether have been by seizure. In the large number of prosecutions which have been recorded, very few involve action against the manufacturer simply because proof was not available or procurable to establish the fact that the substandard condition of the product existed prior to interstate shipment. In a recent ambitious survey of official drug products, designed to show the condition as produced by manufacturers, very few substandard articles were found. It is recognized that the results of this work did not show the condition, particularly of perishable products when sold by the retailer for consumption. It is certain that stocks of such drugs have frequently been purchased in injudicious amounts and too often held under circumstances unfavorable to their satisfactory preservation. Unquestionably the retailer himself is entitled to protection against a transaction in which he would become an offender without knowledge. The incorporation in the bill of authority by the Secretary to impose upon drug manufacturers the adoption of precautionary measures in the marketing of drug products liable to deterioration should meet with wholehearted approval by both the consumer and the retailer.

No class of drugs has so nearly escaped definitely effective regulation as antiseptics and germicides. To no class of drug products can existing legislative authority be applied with such little consequence. In our initial investigations, articles claiming germicidal properties were themselves sometimes found to be actually contaminated with viable organisms. In the later years in which most of the popularity of antiseptics is encompassed, great progress has been made in the improvement of the quality of such drugs. Admittedly, the standard by which they are now gauged is an arbitrary one. Admittedly also, a germicide of little value for the destruction or inhibition of the growth of the strain of organisms by which its worth is appraised may produce satisfactory results under certain conditions of use against other organisms of a pathogenic character. At present, generalization characterizes the labeling claims and advertising representations of such drugs. It is the purpose in the pending bill to have generalized assertions give way to those of a specific character. Labeling indicating the use or uses to which an antiseptic product may be put and the conditions and duration of time required to effect the results will promote discriminating buying and protect the public against the sale of those particular articles which would be of slight or no value in the treatment of a given condition.

I have commented, unnecessarily perhaps, on the individual paragraphs of those sections which define adulteration and misbranding of drugs. I have done so with the idea of conveying to you some understanding of the particularity with which our experience has indicated to us the character of legislative authority which should be provided for effective regulation of traffic in drugs. Too frequently, as has been exemplified by our operations on antiseptics and germicides, administrative officials are required to take advanced positions in an attempt to protect the public and to standardize trade. In such instances they are condemned for the adoption of bureaucratic methods and the assumption of power they do not possess. It is immeasurably better, if well known and well-established abuses are to be exterminated, that the law shall in principle, contemplate this and make, where possible, specific provision for an exercise of the power necessary to accomplish that end.

There are other features of this measure general in application which may be termed innovations.

The extent to which false and misleading advertising has prevailed in the promotion of trade in food and drug products is recognized by every one. It is admitted by manufacturers, advertising agencies, publishers and broadcasting organizations. No matter what the competitive situation is, there can be no justification for resort to statements in the press and over the radio which the law of our land forbids on the label. This proposal to prevent advertising statements not consistent with the truth is merely a much needed extension of the principle enunciated in the existing law in its limitation of the assertions which can appear upon the labeling of the product itself. A continuation much longer of present advertising practices and certainly any further extension of them into the field of unbridled fancy, will do the industry no lasting good. This is known by those awake to the promotion of their own welfare. Isn't it significant that,

show that the labeling is not only false but is fraudulent. This involves the disclosure of an element of intent. Under the most favorable circumstances the existence of a purpose to defraud is difficult to prove. The Department's long-time advocacy of a modification of this harsh requirement has been characterized as an attempt to create conditions which would make success for the government in future litigation more definitely certain. This is not the case at all. Accepting the repeated assertions of the courts that the law is for the protection of the consumer it becomes necessary, if the public is to benefit by these decrees, that the present illogical and inconsistent situation created by this paragraph be radically remedied. Repeatedly, in the court room, I have witnessed the introduction of overwhelming expert testimony to show the lack of value of the products on trial. Repeatedly unbiased scientific witnesses, whose evidence was not and could not be refuted, have sworn that such products could not make good on their claims to cure. Repeatedly verdicts against the people have been rendered because of the Government's inability to prove that the manufacturer unquestionably possessed full knowledge of that fact.

The sale of a 'white liniment' as a treatment for tuberculosis, cancer and locomotor ataxia, or the sale of an extract of an innocuous weed as a cure for diabetes, could be undertaken only by one wholly ignorant of the most elemental facts about medicine or by one who deliberately embarked upon a campaign to defraud. If such an article were marketed by the latter, that transaction would be in violation of law. In that case the public is protected. If by the former relying upon local traditions which may ascribe magical properties to the product and believing that the promises held forth were capable of accomplishment by persistent use of it, there is no offense. The product in each case is the same. To the public the result is the same. If protection is contemplated in one instance, why not in the other? The courts have said that a manufacturer of a drug product should have superior knowledge. On no other assumption can his ministrations to the sick be justified. Hasn't the time arrived when we should give unmistakable expression to this requirement?

The second provision of paragraph (a) will eliminate the necessity to show fraud and authorize remedial action in all instances where claims for the curative properties of any medicine are made contrary to the general agreement of medical opinion.

The next two succeeding paragraphs (b) and (c) relate to the declaration of narcotics and to alcohol, ether or chloroform. They are in form and requirement slightly different from those which now obtain.

Paragraph (d) requires on drug products other than disinfectants for which special provision has been made, specific directions for use with the proviso for exemption in those instances where protection of public health makes it unnecessary.

Paragraph (e) calls for informative labeling. It has its counterpart in the section defining misbranding of foods. In this the necessity for a disclosure of the complete formula is not imposed. Only the name and the quantity of each active ingredient must be given. I am aware of the opposition to formulas disclosures. It is asserted that such information on the label is of slight, if any, value to the consumer and that it requires divulgence of trade secrets. In my conversations with representatives of drug manufacturers I have had the opinion expressed frequently to me that manufacturers stress as a secret and property right not so much the composition of the product, which after all could be determined by competent analysts but the method of preparation. While it is true that a full disclosure of all the ingredients of a drug product may be of no valuable import to all consumers this necessarily will not be always true. Certainly it will be informative to a large percentage of consumers and, on the theory that opportunity for full and complete information should be accorded the purchaser as a right, this requirement in principle should prevail.

Paragraph (f), requiring on products which are marketed under names recognized in or which simulate those recognized in the United States Pharmacopœia or National Formulary to be packaged and labeled as required by these authoritative texts, is merely supplemental to the terms of the adulteration section relating to official products.

The provisions of paragraph (g) are of special interest to the distributing drug trade particularly the retailer. A federal act based upon the interstate commerce clause of the Constitution, as is the existing law and the one proposed has jurisdiction over interstate transactions only. If a substandard condition rendering a product violative of the provisions of the act is due to deterioration and occurs subsequent to its interstate shipment no offense has been com-

mitted by the manufacturer or shipper and no criminal action can be directed against him. This constitutional limitation makes the federal law an insufficient and ineffectual measure for complete public protection. How to avoid the consumption of perishable drugs whose potency has diminished or disappeared is a problem which has presented innumerable administrative difficulties. The marketing of ether is an illustration. Most of the remedial measures against shipments of ether have been by seizure. In the large number of prosecutions which have been recorded, very few involve action against the manufacturer simply because proof was not available or procurable to establish the fact that the substandard condition of the product existed prior to interstate shipment. In a recent ambitious survey of official drug products, designed to show the condition as produced by manufacturers, very few substandard articles were found. It is recognized that the results of this work did not show the condition, particularly of perishable products, when sold by the retailer for consumption. It is certain that stocks of such drugs have frequently been purchased in injudicious amounts and too often held under circumstances unfavorable to their satisfactory preservation. Unquestionably the retailer himself is entitled to protection against a transaction in which he would become an offender without knowledge. The incorporation in the bill of authority by the Secretary to impose upon drug manufacturers the adoption of precautionary measures in the marketing of drug products liable to deterioration should meet with wholehearted approval by both the consumer and the retailer.

No class of drugs has so nearly escaped definitely effective regulation as antiseptics and germicides. To no class of drug products can existing legislative authority be applied with such little consequence. In our initial investigations, articles claiming germicidal properties were themselves sometimes found to be actually contaminated with viable organisms. In the later years in which most of the popularity of antiseptics is encompassed, great progress has been made in the improvement of the quality of such drugs. Admittedly, the standard by which they are now gauged is an arbitrary one. Admittedly also, a germicide of little value for the destruction or inhibition of the growth of the strain of organisms by which its worth is appraised may produce satisfactory results under certain conditions of use against other organisms of a pathogenic character. At present, generalization characterizes the labeling claims and advertising representations of such drugs. It is the purpose in the pending bill to have generalized assertions give way to those of a specific character. Labeling indicating the use or uses to which an antiseptic product may be put and the conditions and duration of time required to effect the results will promote discriminating buying and protect the public against the sale of those particular articles which would be of slight or no value in the treatment of a given condition.

I have commented, unnecessarily perhaps, on the individual paragraphs of those sections which define adulteration and misbranding of drugs. I have done so with the idea of conveying to you some understanding of the particularity with which our experience has indicated to us the character of legislative authority which should be provided for effective regulation of traffic in drugs. Too frequently, as has been exemplified by our operations on antiseptics and germicides, administrative officials are required to take advanced positions in an attempt to protect the public and to standardize trade. In such instances they are condemned for the adoption of bureaucratic methods and the assumption of power they do not possess. It is immeasurably better, if well-known and well-established abuses are to be exterminated, that the law shall, in principle, contemplate this and make, where possible, specific provision for an exercise of the power necessary to accomplish that end.

There are other features of this measure general in application which may be termed innovations.

The extent to which false and misleading advertising has prevailed in the promotion of trade in food and drug products is recognized by every one. It is admitted by manufacturers, advertising agencies, publishers and broadcasting organizations. No matter what the competitive situation is, there can be no justification for resort to statements in the press and over the radio which the law of our land forbids on the label. This proposal to prevent advertising statements not consistent with the truth is merely a much needed extension of the principle enunciated in the existing law in its limitation of the assertions which can appear upon the labeling of the product itself. A continuation much longer of present advertising practices, and certainly any further extension of them into the field of unbridled fancy, will do the industry no lasting good. This is known by those awake to the promotion of their own welfare. Isn't it significant that,

according to current press reports, two associations of manufacturers of package medicines, independently and simultaneously, filed with the National Recovery Administration codes of fair competition which prohibited the publication of any false, untrue or deceptive advertisement?

Thus bill, in prohibiting false advertising, is taking with enthusiastic public approbation a chapter out of the book of ethics which the industry has written for itself

There is another general feature which has been the subject of extensive speculation and that is control by permit This is a resort to the system of regulation by license employed so prevalently during the period of the War It is potent for more specific direction of manufacturing operations than are measures whose remedial powers depend upon the visitation of penalties It has at times been advocated as the appropriate means of supervising the drug traffic by those whose special interests are within that sphere For certain specialized drug products it is a control method now authorized by existing laws and employed satisfactorily From several sources it has been endorsed by those speaking with the consumer's interest in mind At this time there are several obstacles to its adoption in a general way, among them the very great cost that would be involved In the bill, resort to such regulation is authorized where a protection of public health makes it necessary and then only when the injurious character of the product cannot be adequately determined after entering interstate commerce

The remedial provisions are materially different from those set forth in the existing law Extreme penalties are not necessary for the regulation of the conduct of the vast majority of our people, no matter in what enterprise they may be engaged Most of us prefer to observe the requirements of law if we only know what those requirements are To that element a legislative prohibition is sufficient to effect observance without regard to penalties This fact, however, merely emphasizes the need for adequate provisions to compel compliance by the minority who do not do so voluntarily A perusal of the indexes of published notices of judgment will disclose the names of certain offenders with such frequency as to suggest that the smallness of the fines now attaching to violations of the law may be paid as a form of insurance to perpetuate a practice involving ruinous competition and an imposition on the public The greatest severity in penalty provisions is for the deliberate offender

I am aware of the fact that there is in your own mind some concern about the extent to which the various sections in this bill confer upon the Secretary power to make certain determinations and decisions If it were possible to incorporate in a law to regulate diverse products of such varying character as found in all types of foods, drugs and cosmetics, specific requirements which would meet all known and all anticipated situations, all of us, including the Secretary of Agriculture himself, would prefer to have that done This is impossible Congress is concerning itself in this proposed legislation with an enunciation of a series of prohibitions In principle, they are definite To determine whether and when they apply, it is necessary for some agency to ascertain the facts and make a formal finding thereon Failure to provide for that flexibility created by this delegation of power to some responsible agency would result inevitably in the enactment of a law which could deal effectively with the practices of to day but which, as such practices change, could not prevent the abuses of to morrow In a comparatively short time such law would become obsolete and the public would demand the enactment of a revision in the same way that that demand is manifesting itself now If provision for this administrative power must be made—and that conclusion is inescapable—on whom more properly should it be placed than the head of that executive branch of the Government which is charged with the responsibility of enforcing the law? The highest court in the land has declared that the present Food and Drugs Act was enacted in the interest of the consumer Its revision by the pending bill will not modify that purpose In such determinations of a factual nature as the Secretary of Agriculture may be required to make, he will of course bear this object in mind Protection of public rights, however, does not require unjust treatment of any firm or person A sufficiently disinterested attitude will so characterize his decisions as to guarantee justness and fair dealing to all Conclusions on important questions can be made only after hearings at which all parties in interest may appear and present their views If, by any chance, an improper motive were to exist and the Secretary were to make decisions capriciously and manifestly unfair, the restraining power of the courts is always available to protect the rights of the manufacturer and dealer

I have always entertained an exalted conception of the value of the pharmacist to society The responsibilities which his calling imposes in preparing and dispensing medicines for the relief



of the ailing must forcefully develop in him that standard of ethics which justifies the confidence so universally accorded him. From boyhood experiences in a small town I recall the respect in which he was held by the populace. Whether he administers to a village or to an urban clientele, his obligations are the same. I am sure that he is conscious of them, and I can lend myself enthusiastically to the furtherance of any cause which has, as one of its objectives, his protection. In the pursuit of a vocation of such important significance to the health of mankind, he would not become an offender wittingly, and if we do not have, we certainly should have laws which will prevent him becoming one unwittingly. He should be protected against an infraction of those standards of action which the importance of his vocation and his own inclinations have formulated. In various respects which you and I both well know the present Federal Food and Drugs Act is insufficient to extend this guarantee. It is to his advantage, as definitely as it is to that of the public, that the present law be revised and that the bill introduced to supplant it be passed.

I participated in the drafting of the provisions of this measure. I have read it carefully several times subsequently, and I fail to find in it anywhere the imposition of an intolerable burden upon an honest manufacturer or merchant. In undertaking to maintain the integrity of food and drug products—in seeking to insure that they possess the qualities and strength which they purport to have—in preventing resort to false representations in any respect, both the existing law and the pending bill contemplate a protection of the purchaser by giving to him only those things which are his by right. It not only encourages, but it requires honest dealing. There can be no burden imposed and consequently no ground for meritorious complaint by an industry when nothing more is required or expected than that.

A question was asked Dr. Campbell relative to Section 9 which deals with false advertising. He replied that Paragraph C of that Section says this—"To discourage the public advertisement for sale in interstate commerce of drugs for diseases wherein self medication may be especially dangerous, or patently contrary to the interests of public health, any advertisement of a drug representing it directly or by ambiguity or inference to have any effect in the treatment of any of the following diseases shall be deemed to be false." He continued "Of course, the diseases mentioned in there are diseases about which different opinions may exist, but they are supposed to call the roll of more or less incurable diseases or those where an undertaking at self medication will be injurious to the individual. The whole purpose of that item is the preservation of public health. There is no prohibition, you must notice, against the sale of these products properly labeled. Even though you may advocate them as of advantage in the treatment of such diseases, it is only the advertising feature that is covered.

"You can sell the product but the whole concept behind the particular author of that amendment, who is one of the individuals participating in its drafting, was that it is not to the advantage of the public nor is it to the particular advantage or credit of the package medicine manufacturers of this country, to create an impulse or an inclination for self medication in instances where self-medication would not be of obvious advantage, but might be of serious consequences and should not be undertaken.

"Let me briefly say this on the subject of self medication. I hold no brief for or against it. In the enforcement of the Federal Food and Drugs Act, I have said repeatedly that it is not the province of that organization to undertake to suppress or to discourage self-medication. I have maintained that the terms of that law, by implication, legalize self medication. Its only requirement is that in those instances where products are sold for self-medication they be free from the conditions imposed under the adulterated section of the act, and the conditions imposed under the misbranding section of the act.

"But I submit there are times when we would not encourage our own families, or those in whom we have a very particular or definite interest, to undertake to cure their own ills if they are of the type contemplated by the list of diseases included in this particular paragraph. That relates only to advertising, and doesn't prohibit the sale of the product labeled properly as an alleviative, for instance, of some of these conditions if described purely as an alleviator.

"There is no joker in it. It is merely a reflection of the convictions of those who have seriously addressed themselves to this undertaking in a fair-minded spirit, both to the consumers and to the manufacturers."

The thanks of the ASSOCIATION was tendered Dr. Campbell.

Local Secretary Emerson D. Stanley was introduced by President Philip. He and Dr.

Richtmann made several announcements relative to entertainment features. President Philip called on Dr. E. L. Newcomb, secretary of the N. W. D. A., who spoke very briefly of his interest in the Headquarters Building. In closing the first General Session, President Philip stated that the next General Session would be called to order promptly at 2:00 P. M. on Thursday afternoon.

### SECOND GENERAL SESSION

The Second General Session was convened by President Philip on Thursday, August 31, at 2:00 P. M. He announced that former President Lucius L. Walton, who was taken ill a day or two ago, was very much improved.

The report of the House of Delegates was read and approved. (See minutes of the House of Delegates.)

#### *To the Association*<sup>1</sup>

As Chairman of the House of Delegates I am pleased to report that the First Session of the House was held on Tuesday, August 29th, with a splendid representation from the state pharmaceutical associations and from the other organizations entitled to membership.

The House was organized for business and heard the Chairman's address and the annual reports of the Council Resolutions in accordance with the By-Laws.

Under the head of New Business the Secretary submitted a written motion to amend Section A of Article 1 of Chapter V of the By-Laws of the Association to provide representation in the House of Delegates for the National Conference on Pharmaceutical Research. This motion was laid over for action at the next General Session.

A number of communications were read and referred for publication.

The Second Session of the House of Delegates will be held this evening and later reports will be submitted.

(Signed) J. W. SLOCUM, Chairman

Secretary Kelly stated that the nominations other than those for the House of Delegates will be submitted by mail to all the members.

President Philip called on Dr. Richtmann who gave the members information regarding the painting of the Honorary President Dr. Edward Kremers, presented by the Alumni of the University and other friends. The portrait will be placed in the Pharmacy Departmental Library of the Chemistry Building. (A half-tone of the painting appears in the September Journal, page 806.)

President Philip called on Secretary H. C. Christensen to speak of the pharmacy exhibit at the Century of Progress, who stated that the AMERICAN PHARMACEUTICAL ASSOCIATION had sponsored this project. He said a space of 1700 square feet was allotted for this exhibit and this space would have cost \$17,000. The space has been given without charge on an equal basis with medicine and dentistry and the basic associations which occupy all of the second floor of the Hall of Science. The proposition of building the fixtures, planning the exhibit and installing it along with the troubles and tribulations have occupied over 1½ years, but the Local Committee composed of Secretary Frank Kirby and Treasurer Julius Riemenschneider and H. C. Christensen as Chairman has had splendid support. Especially good cooperation has been given by the universities of the middle west including the University of Wisconsin, Purdue University and the University of Illinois.

The purpose of the Century of Progress Exhibit is indicated by the name. The exhibit had to be restricted to the historical educational and professional studies and it was necessary to exhibit this so as to attract the public. Among the items selected for this were digitalis, iodine and cinchona. In the exhibit it was attempted to show the progress made in the preparation and standardization of drugs. In the Educational Department the sciences entering into pharmacy and the educational qualifications required of those who enter it were outlined. In his opinion the exhibit of pharmacy had been well worth while because it has interested the visitors. He thought that this exhibit would better acquaint the public with the professional standing of pharmacy.

The proposition of securing funds for this project in times like the present, was a rather difficult one. This part of the work was in the hands of Treasurer Riemenschneider and Secretary Kirby. The exhibit up-to-date has cost between six and seven thousand dollars, the budget

<sup>1</sup> Presented at First General Session—see page 1008

was planned for fifteen thousand but that much will not be necessary, but considerably more than we have on hand will be needed. He spoke in behalf of the attendant, Miss Esther Barney, that she is exceptionally well fitted for that position. She speaks several languages and is constantly up and doing and is not afraid to speak out when it is necessary. He cited several examples of her watchful care. She has made a remarkable record in handling the crowds and in keeping them good natured and securing registrations of pharmacists as they come in. He spoke of the general attendance and referred to one day when 130 pharmacists registered and these were from 31 states.

Treasurer Riemenschneider spoke of the difficulties in raising money and the amount that would be necessary in order to defray all of the expenses of the exhibit.

Secretary Kirby referred to the continuous work of Secretary Christensen and he hoped that contributions would be forthcoming from the members who had seen the exhibit. He stated that pharmacists might well be proud of it.

Secretary Slocum of the Iowa Association thought that an appeal to the State associations would be productive of funds sufficient for the purpose. He was authorized to contribute \$25 on behalf of the Iowa Association.

F. H. Freericks did not want to let the opportunity pass without saying a word for the exhibit. "It is impressive and hardly anyone comes into the Hall of Science without seeing first the American Pharmacy exhibit. Chairman Christensen and his associates have rendered a service which American Pharmacy can hardly repay." He moved a rising vote of thanks to Chairman Christensen and his associates which was given.

Dean C. B. Jordan stated that the American Association of Colleges of Pharmacy had contributed \$50 to this worthy project. If every State pharmaceutical association would do likewise the needed \$2500 would be collected.

George Judisch stated that in his opinion Iowa should give \$50, and hoped that every state would contribute according to its ability.

Dr. Dunning was certain that Maryland would contribute \$50. Secretary Kelly said he would like to write into the records that Maryland had already contributed \$25 and Dr. Dunning remarked that the \$50 was in addition. (We have since been advised that more had been given.) President Philip stated that after the completion of the program the subject would be opened again and all those who wished the opportunity of contributing could have it.

The next order of business was the symposium on "Professional Pharmacy," Part I of which is "The Foundation of Success for Professional Pharmacy," by E. F. Cook of Philadelphia. He said that he had seen the exhibit at Chicago having spent four days at the Fair and came back to the pharmaceutical exhibit many times. He concurred in all that had been said. The exhibit presents a splendid opportunity to impress the public with the fact that pharmacy is a profession, serving in the interest of public health. He said that what Chairman Christensen and his co-workers have done and are doing is a demonstration of what pharmacy is doing. There is evidence of scientific development. He referred to the various exhibits connected with pharmacy and the wonderful influence for good through these exhibits.

The symposium which had been prepared on "Professional Pharmacy" for the Second General Session was splendidly carried out and will be separately printed in the November issue of the JOURNAL including discussions and the introductory remarks by Chairman E. Fullerton Cook.

## SYMPOSIUM ON PRACTICING PROFESSIONAL PHARMACY

### PART I—MEETING THE PHARMACEUTICAL NEEDS OF THE PRACTICING PHYSICIAN

The Foundation of Success for Professional Pharmacy, E. Fullerton Cook

Extending the Use of Official Products, E. N. Gathercoal

The Purpose and Influence of the "New and Non-official Remedies," by a representative of the A. M. A.

The Value of the A. P. H. A. Recipe Book, J. Leon Lascoff

The Growth of Professional Pharmacy, C. B. Jordan

Cooperation between Physicians and Pharmacists of the Northwest, George Bender

The Finds Concerning Professional Pharmacy in St. Louis, Frank H. Delgado

Pharmacology in the Medical Curriculum and the United States Pharmacopoeia, John C. Krantz, Jr

"Selling" Professional Service, Anton Hogstad, Jr

#### PART II — THE HOSPITAL PHARMACY

The Western Reserve University Plan for Hospital Pharmacies, Edward Spease

The Hospital Formulary, Robert A. Hatcher and Wendell J. Stansby

The Benefits to a Hospital through Efficient Pharmaceutical Service, Harry E. Bischoff

General appreciation was expressed by the members

President Philip stated that the members undoubtedly consider this a worth while program and he thanked the speakers on behalf of himself and the AMERICAN PHARMACEUTICAL ASSOCIATION for the contribution

The Local Secretary made an announcement relative to the entertainments

The Second General Session of the ASSOCIATION was then adjourned

#### THIRD AND FINAL GENERAL SESSION

The Third and Final General Session of the Eighty-First Annual meeting of the A. P. H. A. was convened by President Philip at 8 35 P. M., September first. Secretary Kelly read the minutes of the Second General Session. (The minutes are not reprinted because they would duplicate the minutes of the General Session as printed.) There being no objection, the minutes were approved.

President Philip called for communications. The Secretary stated he had none.

Mrs. Philip referred to the Headquarters Building in Washington and said she desired to present for the Museum a thesis from which she read several paragraphs. She stated that in this thesis there are one hundred fifty pages. It gave her great pleasure to present "The Human Soul Is Tangible" to the AMERICAN PHARMACEUTICAL ASSOCIATION for the Museum.

President Philip, on behalf of the AMERICAN PHARMACEUTICAL ASSOCIATION, accepted the thesis and stated that he knew this had been a labor of many years on the part of the donor.

President Philip called for the final report of the House of Delegates. It was read by Secretary Kelly. (These are not published here as they are part of the minutes of the House of Delegates in this issue.)

Secretary Kelly stated that there were no items of business that required special comment except to say that reports of standing committees of the ASSOCIATION were received. Another item of business was the report of the Committee on Resolutions, this Committee presented a series of resolutions which were discussed, adopted *seriatim*, and the report of the Committee was adopted as a whole. Mr. P. H. Costello, of North Dakota, was installed as Chairman of the House and S. A. Williams, of Alabama, as Vice-Chairman by proxy, W. E. Bingham representing him.

Secretary Kelly respectfully requested that Acting Chairman Fischels be given time to read the resolutions by title so that the members attending the General Session, who did not hear them in the House of Delegates, would know what the resolutions cover. The Acting Chairman read the resolutions by title.

President Philip inquired whether anyone desired to have the resolutions read in full. There being no request, President Philip asked for the adoption of the report. A motion was accordingly made by R. C. Wilson and duly seconded. The resolutions were adopted.

Secretary Kelly reported that a motion was submitted at the previous General Session providing for membership in the House of Delegates for the National Conference on Pharmaceutical Research. The motion reads:

"It is moved that Section A of Article I of Chapter V of the By-Laws of the ASSOCIATION be amended by the addition of the words 'The National Conference on Pharmaceutical Research'." The Secretary moved adoption of the motion. It was duly seconded and carried by vote.

President Philip stated that the next item of business was the presentation of the Ebert Prize and inquired whether the Chairman or Secretary of the Scientific Section was present. The Secretary stated that he had understood provisions were made at the session of the Scientific Section for this presentation.

Secretary Rowe reported that Chairman Husa was designated to make the presentation, not being present, action was deferred.

The President stated that the next order of business was the presentation of a fellowship in the National Conference of Pharmaceutical Research. The presentation was made by Secretary John C. Krantz, Jr., who spoke in part as follows:

'One of the functions of the National Conference on Pharmaceutical Research is to correlate and stimulate research along pharmaceutical lines in America. For the past two years this Conference has awarded a fellowship to a student pursuing work for the doctorate degree in pharmacy or one of its combine sciences in schools of pharmacy in this country. This year after examining the credentials of all candidates applying for this fellowship, the Committee has elected Mr. Ivor Jones of the School of Pharmacy of the University of Washington as a recipient of this fellowship.'

Dr. E. V. Lynn represented Mr. Jones, and Secretary Krantz presented the \$500 fellowship of the National Conference on Pharmaceutical Research.

In accepting the fellowship Dr. Lynn stated that it gave him a great deal of satisfaction to be able to accept this fellowship on behalf of Mr. Jones, who is one of his honor students and in his opinion would be one of the leaders of American Pharmacy in the not too distant future.

President Philip called on Local Secretary Stanley for announcements. He explained the arrangements for the trip to The Dells and also presented the golf tournament prize to Dean Wilber J. Teeters.

President Philip called on Chairman W. J. Husa to present the Ebert prize. He spoke in part as follows:

'It is generally recognized that in order to maintain the high standing of our profession research must be encouraged and the results made available by a program of publications.' "These facts," he stated, "were recognized by that far seeing pharmacist Albert E. Ebert when he established this prize which is awarded for the most valuable paper presented during the year." He stated that the prize for 1933 had been awarded to Ewin Gillis and H. A. Langenhan of the University of Washington for their paper presented last year, entitled— "The Study of Hydrastis Canadensis." He called on Dr. E. V. Lynn of the University of Washington to receive the medal for his colleagues. Dr. Lynn said he did not know what Dr. Gillis and Dr. Langenhan would say under the circumstances but it gave him a great deal of pleasure and gratification because he had some little part in this work to accept the medal.

President Philip was pleased to announce that former president L. L. Walton who had been taken sick during the convention had improved and was getting along very nicely. He requested the Secretary to convey best wishes to the former presidents L. L. Walton, C. W. Johnson also to Dr. A. R. Bliss, Jr., whose illness had been reported.

President Philip announced that this concluded the business of the Association with the exception of installation of officers; he had hoped that Vice President Jones would preside at this session but he was not present.

Walter D. Adams and H. V. Army were invited to the platform. They had been elected members of the Council and also H. C. Christensen who had returned home. They were duly installed.

President Philip called on Mr. Adams to present Secretary E. F. Kelly, Dr. A. G. DuMez Editor of the YEAR BOOK, and E. G. Eberle, Editor of the JOURNAL, for installation.

The foregoing responded briefly expressing thanks for the honors conferred.

President Philip stated that the Treasurer, Charles W. Holton, had not returned from a visit to Europe, he was declared duly installed. Proceeding with the order of installation, Dr. John C. Krantz, Jr., Second Vice-President, was introduced. In acknowledging the honor he said that he was not unmindful of the high privilege of serving the Association and pledged his support to the officers and members.

On behalf of the Baltimore Retail Druggists Association, Andrew F. Ludwig presented Dr. Krantz with a bouquet of flowers.

The First Vice President Dr. Robert P. Fischelis, was introduced and installed. He expressed his appreciation for the honor conferred, he was, especially pleased to serve under President Robert L. Swain.

The President Elect was then introduced. President Philip referred at some length to the work of Dr. Swain in various divisions of pharmacy and transferred to him the gavel of the Association. He, then, asked Mrs. Swain to pin the badge of office on the President.

The audience rose and applauded in approval of President Philip's beautiful conclusion to a well conducted ceremonial and expressive of their regard for Dr and Mrs Swain and the esteem in which the former is held

#### ADDRESS OF PRESIDENT R L SWAIN

"Ladies and Gentlemen, Friends of the AMERICAN PHARMACEUTICAL ASSOCIATION It is my happy privilege to have been a member of this ASSOCIATION since 1909, and becoming a member was one of the first acts I did after graduating in pharmacy from the University of Maryland I have been an interested member of this organization during those years, although I was not in position to attend any of its national gatherings until the Asheville meeting in 1923 Since that time, it has not only been my privilege but it has been a very great pleasure to take some part in the work which this ASSOCIATION has done, to play some little part in the work which it has carried on, and at no time in my participation in the affairs of this ASSOCIATION, have I wavered in my earliest conception of what the ASSOCIATION was, the most fundamental and the most intrinsically fine influence in American pharmacy

It goes without saying that a person cannot ascend to this office without being mindful of the honor which it confers, and I take it a man cannot accept this honor without an equal realization of the duty which it carries with it, and the responsibility which it imposes I assure you that in accepting the honor, I do not separate it from the duty and the responsibility, and it shall be my intention, to the limit of my abilities, to perform the duty as best I can, and to discharge the responsibility for the next twelve months

"I have taken a great deal of pleasure, and derived much real profit as well, from a rather careful study of the work which this ASSOCIATION has done during the eighty-one years of its history Some of the most interesting reading I have been in position to do in recent years has been to go back through the YEAR BOOKS of this ASSOCIATION and follow step by step, sometimes a rather deliberate step, what this ASSOCIATION has done in the achievement of its great purposes

"The reading of the Code of Ethics of this ASSOCIATION and also the other great principles to which this ASSOCIATION has adhered since the very earliest days, convinces one that at no time has the ASSOCIATION been concerned with anything except matters of great importance It is to its credit, I think, that it has never allowed itself to be particularly concerned with mere passing things of the moment, trivial things It has never lent its name or its great influence to things which were of no fundamental relationship to pharmacy At no time, however (and this is very clearly set out in its history), has it wavered in its adherence to the principles to which it first became devoted, and it has kept true to them throughout the whole eighty-one years of its existence

Reading these YEAR BOOKS and going back to the addresses which my predecessors in this great office have made I have been impressed with the fact that certainly in their day the men whom you have called to this office must have been (and this, of course, will have no relationship to myself) the most outstanding men in pharmacy at the time of their election I know of no more profitable task than to go back through those early records and follow year by year the work which those great men have done It seems to me that as I try to evaluate the services which they have rendered I am rather conscious of the fact that at no time has the Presidential robe been badly worn To me, it is a very stimulating thing to know that such a high standard of performance, such a high standard of principle has been set I can assure you I shall not suffer from any greater ambition nor shall I be the subject of a more cherished desire than to maintain the standard which my predecessors have set

"I doubt whether any man ever assumed the Presidency of this ASSOCIATION during a period when all forces, which have heretofore been accepted as rather stable forces, are more confused I have often thought of the time through which my very dear friend, Bruce Philip passed during his term of office, and I have often tried to visualize what his mental attitude must have been to a great many things which must have occasioned him great concern. No man trained in the law as he is trained, and no man having had the experience such as he has had, could view casually the great drama which is now being unfolded in our American life

"I doubt very much that the changing scene will be confined entirely to our political life. Certainly it is going to have a profound effect, and is meant to have a profound effect, on our

economic existence I am rather inclined to feel that the changes which are taking place in our political government and the changes which are taking place in our economic life, will be reflected in such organizations as this

I do feel, however, that I am in a better position than President Philip was, because I can imagine that he, who at that time was just about to assume the duties which he has just relinquished to me (because I can recall quite clearly that small band of persons who met at the site of the headquarters building in Washington and saw Dr Samuel Hilton break the ground for the building of the edifice which is now in actual existence as the American Institute of Pharmacy), may have had some grave doubts as to the final consummation of that wonderful undertaking I say I am in a bit more fortunate position because the doubts which beset him cannot, so far as that is concerned, beset me

'It was my happy privilege on Monday of this present week to be in the headquarters building of this ASSOCIATION and I must admit that my heart filled with pride When I looked upon that edifice of classical design, of matchless white, in such an unsurpassed environment, my heart swelled with pride when I realized that that institution was to be made a great instrumentality for the furtherance of the work of this ASSOCIATION

'I congratulate President Philip and his co-workers (and he had many) in that this building was actually begun in his administration and brought to such a beautiful consummation within the same period I rather imagine that whatever additional honors may come to him, or what additional burdens he may be called upon to assume, he will regard the successful consummation of this one great project as perhaps the most outstanding work of his life

You have chosen me to serve as President of this ASSOCIATION, and I can't tell you that it was altogether unforeseen, because I have been the President-Elect for a year I might tell you, however, that being President-Elect has its advantages and disadvantages There are some persons (and this refers particularly to some of the pharmaceutical press) who don't distinguish as they should between the President Elect and the President of the AMERICAN PHARMACEUTICAL ASSOCIATION Sometimes you slip into rather confusing situations because of their failure to make this distinction

However, the advantages derived from being the President-Elect are many, and I have been denied none of those advantages It has been my privilege to work closely with Bruce Philip He has been most courteous I have been asked to participate in conferences and in consultations which perhaps would not be the lot of every President Elect, because of the fact that I was close to him, he being in Washington and I being in Baltimore

'It has also been an unusual privilege to work closely with my very dear friends, Dr Kelly and Editor Eberle So I might say, without the slightest spirit of egotism, that I have been through a period of training as it were, during the last twelve months At any rate, while I was most meticulous in my observance of the proprieties so far as the Presidency was concerned, and at no time allowed myself to be put in the position which might in any sense be regarded as an invasion of the prerogatives of the President himself, I have, nevertheless, been able to formulate some plans which I would like to put into effect this coming year

"As I say, you have elected me to the Presidency of this ASSOCIATION, and I am going to take a few moments (and I assure you the moments will be few) to give you some idea of the things I hope to do during the next twelve months

'First of all, let me say that we owe a duty to this ASSOCIATION which far transcends our responsibility as a mere member Every pharmacist owes this ASSOCIATION a tremendous debt As I said before, the AMERICAN PHARMACEUTICAL ASSOCIATION has been the nurturing ground, has been the very foundation as it were of the professional aspects of pharmacy For years—going on a century now—it has bent its every energy toward the development of professional pharmacy The early ideas which actuated this ASSOCIATION found their way eventually into the laws of the various states Those ideas have also found their way into some of the federal statutes, and in actual fact, as well as in contemplation of law, pharmacy is a professional undertaking engaged in administering to public health

'If this is true, if professional pharmacy is the intrinsic thing in pharmacy, if professional pharmacy is the outstanding mark of distinction which has been placed upon the drug store both by custom and by law, then it seems to me the ASSOCIATION which represents professional pharmacy is entitled to a great deal more at the hands of the profession than it has received

'It seems to me a most unfortunate thing that this ASSOCIATION should be compelled to stress the necessity for membership. I could almost state that it is an indictment of professional pharmaceutical opinion that the membership of this ASSOCIATION has reached so low a figure. I don't wish to alarm you. The ASSOCIATION is in no special danger, but there is a vast inconsistency between the support which we have given the ASSOCIATION and the position of importance which the ASSOCIATION occupies. For that reason, I am going to devote as much of my time and my efforts and my energy during the next twelve months to doing what I can to build up the membership of this group.

'Again, don't consider this in any sense an egotistical statement. It is far from it. I want you to also bear in mind as I make these remarks about membership that I am quite familiar with the membership arrangements which have been in effect for some time. I know there is a national Membership Committee. I know also that the states have been divided into groups, and a chairman for each group and that there have been sub-chairmen appointed for the various states. I must admit I don't know how the arrangement came about.

I can well see that when it was first established it was a very fortunate arrangement, and may still be. I am going to ask, in case it is my privilege or duty to appoint these committees even though I do appoint a national Membership Committee and also the various sub-committees that the committees even after they are appointed grant me more or less the personal privilege of doing what I can to build up the membership.

Frankly, I can't say I have given this all the thought it deserves because within the last two or three days, during our stay here some things have come to the surface which would have a bearing upon any plan had I worked any plan out. However, I am going to ask some of the men in the AMERICAN PHARMACEUTICAL ASSOCIATION, and the National Association of Boards of Pharmacy, with whom I have worked intimately for a number of years, to assume some of the responsibilities of this work. I am going to select, as judiciously as I can from the persons upon whom I think I can make a personal demand to undertake in the various states the work which I may suggest to them.

I don't in any sense look upon this as an ambitious plan. It may not work and, to fall back upon the rather safe language of President Roosevelt if I can realize seventy five per cent of my ambition in this respect, I assure you I will be most happy indeed.

'I shall also frankly ask the deans of the colleges of pharmacy, with whom I have close personal acquaintance to assist in so far as they can in this membership undertaking. I shall have no hesitancy at all in making what some of my friends in the National Association of Boards of Pharmacy may think an unreasonable demand upon them.

I sincerely hope I may emulate the work done by our good and dear friend, Dr Walton during his presidency, when he made it his business to see to it that every member of the National Association of Boards of Pharmacy was also a member of the AMERICAN PHARMACEUTICAL ASSOCIATION.

I am not undertaking this membership project if you please, for any personal reason. I feel, and I feel very sincerely that the inconsistency in the membership of the AMERICAN PHARMACEUTICAL ASSOCIATION and the vastly important work which it has done and which it must do, simply must be faced and we must put the ASSOCIATION in the place where it will not be embarrassed when it seeks to speak for professional pharmacy, as it has spoken in the past and as it must speak again in the future.

So when I do ask you, as ask you I undoubtedly shall, to undertake a portion of the work of building up the membership in this ASSOCIATION, I can tell you very frankly I shall not expect many refusals to undertake the task.

There are a number of other things which I have given my thought to, and I might refer briefly to the publications of the AMERICAN PHARMACEUTICAL ASSOCIATION. I know there have grown up in the ASSOCIATION probably two or three schools of thought regarding its official publication, the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Let me say at this point that there is no man alive for whom I entertain a higher regard than Dr Eberle Editor of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION. You have in him not only a faithful servant but one who gives of his services long after he should be in bed, and you have no idea of the work which he does. It has been our privilege at our home on a number of occasions to entertain Dr and Mrs Eberle at dinner, particularly on



Sundays, and at eight o'clock we are already ready for his customary statement, 'I will have to go now I have to get some proof ready for the mail,' or 'I have to do this or that' I doubt very much whether there is a night of his life that he can't be found in his office at midnight I say that because I know I make this statement so that nobody can possibly misunderstand what I am going to say I don't think anybody could

There has grown up in the ASSOCIATION the feeling (and I think the justified feeling) that perhaps the time has come when we should give serious thought to the publications of the AMERICAN PHARMACEUTICAL ASSOCIATION, and to me that takes on added emphasis when we begin to consider the increase in membership, because it is perfectly obvious whatever increase in membership we are able to effect will be in the practicing group of pharmacists

It can be said to the everlasting credit of the educational institutions that from the very beginning they have almost had a complete membership in this body The same thing is true of the research workers, and the various scientists interested in pharmaceutical endeavors So I take it that the increase in membership is almost bound to come from the practicing class

"Therefore, as I enter upon the Presidency of this ASSOCIATION, I look upon the necessity of working out this publications' problem as a bit more pressing maybe than heretofore I subscribe totally to the feeling that the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION should continue to be the highest exponent of professional pharmacy in the United States I subscribe fully to the feeling that nothing should be done which would in the least detract from the high purpose that JOURNAL serves in various sections of the country, and in educational and professional service

I am also sympathetic with the view, however, of another school of thought which has grown up in the ASSOCIATION, and that is that even though the membership should be pretty nearly what it is now, the JOURNAL should give as much thought and as much space to professional and scientific material as possible, and at the same time give more popular expression to news and to matters not necessarily professional, and certainly not technical

'At the present time, I think there has been a very happy medium established because the JOURNAL must, of necessity, appeal as widely as possible to all the members of the ASSOCIATION But I do look forward to the time and if the ASSOCIATION is permitted to grow as I sincerely hope it may, when we may give serious thought to another type of publication in addition to the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

'In making these statements, of course you are not to assume that I am speaking from original thought at all I know there has been a committee working in the ASSOCIATION for some time probably with the objectives in view that I have stated I only present the matter at this moment and in this way feeling that it will be necessary in a comparatively short while to have two types of publications

At this point I want to state again, even at the risk of being guilty of repetition, that I have never had the slightest misgiving as to the soundness of the policy which the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION has pursued I have none now and every statement I am making is looking ahead rather than looking back

'It was my happy privilege about an hour or more ago to meet at dinner the Past-Presidents of this ASSOCIATION I understand they broke their time honored rule and let their good friend, Bruce, and myself come in I was impressed however with the fact that some of the problems which concern us now have concerned other Presidents as being equally important as some of the problems which now confront us I remember Dr Dohme made a strong plea when he was in the Presidential chair back I think, in 1916 or 1917, for the unification and the federation or the amalgamation, if the term is more definitive of the organizations in pharmacy Doubtless the time was not then propitious

I was present also on the occasion when Dr Walton delivered his Presidential address and I remember with what earnestness he pled for a merger of the two national pharmaceutical organizations Doubtless the time then was not sufficiently propitious

"But I am impressed from the experiences I have had in Washington in connection with Dr Kelly, Bruce Philip and some of the rest of us that perhaps the time has come when we should give serious attention to the unification of our forces President Philip referred to this very courageously in his Presidential address I say courageously, because you always run the risk of your motives being misunderstood and your language misinterpreted But we have

'It seems to me a most unfortunate thing that this ASSOCIATION should be compelled to stress the necessity for membership I could almost state that it is an indictment of professional pharmaceutical opinion that the membership of this ASSOCIATION has reached so low a figure. I don't wish to alarm you The ASSOCIATION is in no special danger, but there is a vast inconsistency between the support which we have given the ASSOCIATION and the position of importance which the ASSOCIATION occupies For that reason, I am going to devote as much of my time and my efforts and my energy during the next twelve months to doing what I can to build up the membership of this group

'Again don't consider this in any sense an egotistical statement It is far from it I want you to also bear in mind as I make these remarks about membership that I am quite familiar with the membership arrangements which have been in effect for some time I know there is a national Membership Committee I know also that the states have been divided into groups and a chairman for each group, and that there have been sub-chairmen appointed for the various states I must admit I don't know how the arrangement came about

I can well see that when it was first established it was a very fortunate arrangement, and may still be I am going to ask, in case it is my privilege or duty to appoint these committees, even though I do appoint a national Membership Committee and also the various sub-committees, that the committees even after they are appointed grant me more or less the personal privilege of doing what I can to build up the membership

Frankly, I can't say I have given this all the thought it deserves because within the last two or three days, during our stay here, some things have come to the surface which would have a bearing upon any plan had I worked any plan out However, I am going to ask some of the men in the AMERICAN PHARMACEUTICAL ASSOCIATION, and the National Association of Boards of Pharmacy, with whom I have worked intimately for a number of years, to assume some of the responsibilities of this work I am going to select as judiciously as I can from the persons upon whom I think I can make a personal demand to undertake in the various states the work which I may suggest to them

I don't in any sense look upon this as an ambitious plan It may not work and to fall back upon the rather safe language of President Roosevelt, if I can realize seventy five per cent of my ambition in this respect, I assure you I will be most happy indeed

I shall also frankly ask the deans of the colleges of pharmacy, with whom I have close personal acquaintance to assist in so far as they can in this membership undertaking I shall have no hesitancy at all in making what some of my friends in the National Association of Boards of Pharmacy may think an unreasonable demand upon them

I sincerely hope I may emulate the work done by our good and dear friend, Dr Walton, during his presidency when he made it his business to see to it that every member of the National Association of Boards of Pharmacy was also a member of the AMERICAN PHARMACEUTICAL ASSOCIATION

I am not undertaking this membership project, if you please, for any personal reason. I feel and I feel very sincerely that the inconsistency in the membership of the AMERICAN PHARMACEUTICAL ASSOCIATION and the vastly important work which it has done and which it must do, simply must be faced, and we must put the ASSOCIATION in the place where it will not be embarrassed when it seeks to speak for professional pharmacy, as it has spoken in the past and as it must speak again in the future

So when I do ask you as ask you I undoubtedly shall, to undertake a portion of the work of building up the membership in this ASSOCIATION, I can tell you very frankly I shall not expect many refusals to undertake the task

There are a number of other things which I have given my thought to, and I might refer briefly to the publications of the AMERICAN PHARMACEUTICAL ASSOCIATION I know there have grown up in the ASSOCIATION probably two or three schools of thought regarding its official publication the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

Let me say at this point that there is no man alive for whom I entertain a higher regard than Dr Eberle Editor of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION You have in him not only a faithful servant but one who gives of his services long after he should be in bed, and you have no idea of the work which he does It has been our privilege at our home on a number of occasions to entertain Dr and Mrs Eberle at dinner, particularly on

Sundays, and at eight o'clock we are already ready for his customary statement, 'I will have to go now I have to get some proof ready for the mail,' or 'I have to do this, or that' I doubt very much whether there is a night of his life that he can't be found in his office at mid night I say that because I know I make this statement so that nobody can possibly misunderstand what I am going to say I don't think anybody could

There has grown up in the ASSOCIATION the feeling (and I think the justified feeling) that perhaps the time has come when we should give serious thought to the publications of the AMERICAN PHARMACEUTICAL ASSOCIATION, and to me that takes on added emphasis when we begin to consider the increase in membership, because it is perfectly obvious whatever increase in membership we are able to effect will be in the practicing group of pharmacists

It can be said to the everlasting credit of the educational institutions that from the very beginning they have almost had a complete membership in this body The same thing is true of the research workers and the various scientists interested in pharmaceutical endeavors So I take it that the increase in membership is almost bound to come from the practicing class

Therefore, as I enter upon the Presidency of this ASSOCIATION, I look upon the necessity of working out this publications' problem as a bit more pressing maybe than heretofore I subscribe totally to the feeling that the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION should continue to be the highest exponent of professional pharmacy in the United States I subscribe fully to the feeling that *nothing* should be done which would in the least detract from the high purpose that JOURNAL serves in various sections of the country, and in educational and professional service

I am also sympathetic with the view, however of another school of thought which has grown up in the ASSOCIATION, and that is that even though the membership should be pretty nearly what it is now, the JOURNAL should give as much thought and as much space to professional and scientific material as possible, and at the same time give more popular expression to news and to matters not necessarily professional and certainly not technical

At the present time, I think there has been a very happy medium established because the JOURNAL must of necessity, appeal as widely as possible to all the members of the ASSOCIATION But I do look forward to the time and if the ASSOCIATION is permitted to grow as I sincerely hope it may when we may give serious thought to another type of publication in addition to the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

In making these statements, of course you are not to assume that I am speaking from original thought at all I know there has been a committee working in the ASSOCIATION for some time probably with the objectives in view that I have stated I only present the matter at this moment and in this way feeling that it will be necessary in a comparatively short while to have two types of publications

At this point I want to state again, even at the risk of being guilty of repetition, that I have never had the slightest misgiving as to the soundness of the policy which the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION has pursued I have none now, and every statement I am making is looking ahead rather than looking back

It was my happy privilege about an hour or more ago to meet at dinner the Past-Presidents of this ASSOCIATION I understand they broke their time honored rule and let their good friend Bruce, and myself come in I was impressed however with the fact that some of the problems which concern us now have concerned other Presidents as being equally important as some of the problems which now confront us I remember Dr Dohme made a strong plea when he was in the Presidential chair back, I think, in 1916 or 1917, for the unification and the federation or the amalgamation, if the term is more definitive, of the organizations in pharmacy Doubtless the time was not then propitious

I was present also on the occasion when Dr Walton delivered his Presidential address, and I remember with what earnestness he pled for a merger of the two national pharmaceutical organizations Doubtless the time then was not sufficiently propitious

But I am impressed from the experiences I have had in Washington in connection with Dr Kelly Bruce Philip and some of the rest of us, that perhaps the time has come when we should give serious attention to the unification of our forces President Philip referred to this very courageously in his Presidential address I say 'courageously,' because you always run the risk of your motives being misunderstood and your language misinterpreted But we have

been confronted in Washington on a number of occasions recently with the criticism that our forces are not united and that, in fact, our forces are disunited. We have been led to believe there would be some very distinct advantages if we could eventually work out a real unification a real solidification of our organizational forces in pharmacy in this country. I was greatly pleased to hear the Resolutions Committee report that the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION had tentatively at least approved in principle the very thing of which I now speak.

'I also would like to see worked out, and for the same reason, a closer, a more workable affiliation between the AMERICAN PHARMACEUTICAL ASSOCIATION and the state associations. I am hopeful that during the next few months the groundwork may be laid for doing this on a very practical basis. My interest in this, again, arises not from any personal consideration, as you might well know, but from my earnest and honest belief that it is going to be necessary for the professional forces in pharmacy to be organized on an effective workable basis.

I feel as though I should apologize for intruding myself upon you at such length on this occasion, and yet I felt it would not be fair to myself and perhaps not fair to you to let the opportunity go by without giving you something in prospect of what I hope to do. I am careful not to say that these things will be fulfilled. I am careful not to do any more than place them on the basis of prophecy backed by personal appeal to those to whom I shall appeal for assistance.

"I remember reading some time ago in some popular magazine some discussion of the philosophy of government. I remember quite well the theme of the editorial went back to the days when the walls of Jericho were destroyed. The persons in authority worked out an ancient governmental idea. The walls of the city lay prostrated. The city was open to invasion by the enemies without, and perhaps from the enemies within. At any rate, the formula established on that occasion was that each man in the city was to be held responsible for the walls about his own house. The rebuilding of the wall around the city meant no more than a unification of action and cooperation on the part of all.

'I feel that in the emergencies which confront pharmacy in this country (and those emergencies are none the less real to you as pharmacists than they are to this ASSOCIATION as an organized body), we should assume our personal responsibility. I think we should assume that that responsibility holds us responsible for the wall about our own house. All I ask of you during this year, as your officers earnestly and diligently attempt to fulfil the duties which you have imposed upon them is that you measure up to your own individual responsibility. If you do I am perfectly willing for you to hold me to strict compliance with my own."

Past-President Philip said, 'May I respectfully remind you that during your year you are to do all the things I forgot to do."

Honorary President Kremers was not present and was declared installed.

Secretary Kelly expressed to the ASSOCIATION his sincere appreciation of the honor conferred for continuing him in office, and to Mr. Philip and the retiring officers his deep appreciation of their fine assistance. He assured President Swain of his heartiest cooperation and said that it was an unusual pleasure for him to work with him and another gentleman, on the stage because he had some little part in bringing him up. He asked to return the privilege and for him to see that he is brought up right this year. He referred in a happy vein to Mrs. Swain—placing the President's pin on her husband, and also to the presentation of flowers to President Swain and the Second Vice-President Dr. John C. Krantz, Jr. He said in part:

'We think down in Maryland that the rest of them, in addition to myself, have had some thing to do with your bringing up. We are very proud, sir, of the honor which has come to our state in the election of yourself (Dr. Swain) and Dr. Krantz. I assure you that these little tokens of appreciation express the sentiment not only of us who are here but of every pharmacist in the State of Maryland to whom you gentlemen have been very good friends, and to whom you have rendered wonderful assistance. I should like to include too, because we are supposed to be south of the Mason and Dixon Line, Mrs. Swain and Mrs. Krantz in this expression of appreciation since we conceive that they, too, have had a part in your bringing up. For the pharmacists of Maryland I am very happy to offer you our congratulations and best wishes."

President Swain said he would make no attempt to express his thanks to the dear friends from Maryland, "we have a way down there of getting next to each other," he said "and they know how I feel and how Mrs. Swain feels, and, doubtless, how Dr. and Mrs. Krantz feel."

On motion duly made and seconded it was voted to adjourn at 9 50 P. M.

# HOUSE OF DELEGATES, AMERICAN PHARMACEUTICAL ASSOCIATION

ABSTRACTS OF THE MINUTES OF THE SESSIONS HELD IN HOTEL LORRAINE, MADISON, WIS., AUGUST 28 TO SEPTEMBER 2, 1933

The First Session of the House of Delegates was convened by Chairman J W Slocum at 1 40 P M., August 29, 1933, he welcomed the delegates present. The roll call showed that a quorum was present and the House of Delegates was declared organized for business.

The names of delegates and organizations represented follow. The name of the organization or state is in *italics*, names of delegates in capitals and small capitals, and the names of voting delegates in bold face.

*The minutes of the House of Delegates are printed here, and to avoid duplication in printing will also answer for the reports of the transactions made to the General Sessions—the reports are abstracts of the minutes. The names of the delegates follow.*

## A PH A SECTIONS

*Scientific*—L E Warren Washington D C  
*Education and Legislation*—R H Raabe Ada Ohio  
*Practical Pharmacy and Dispensing*—I A Becker, Chicago Ill.  
*Commercial Interests*—Rowland Jones Gettysburg S Dak.  
*Historical Pharmacy*—L E Warren Washington D C.  
*Conference Pharmaceutical Association Secretaries*—Charles J Clayton, Denver Colo.  
*Conference Pharmaceutical Law Enforcement Officials*—George W Mather Albany N Y.

## A. PH A. BRANCHES

Baltimore—C Jelleff Carr  
 Chicago—Ralph E Terry  
 Cincinnati—Frank H Fredericks, CHARLES G MERRELL  
 New York—Hugo H Schaefer, H V ARMY CHARLES W BALLARD  
 Northern Ohio—Edward Spease, EDWARD D DAVY  
 Philadelphia—Frank H Eby, E FULLERTON COOK  
 Pittsburgh—C Leonard O'Connell, EDWARD C CLAUS E C. REIF

## NATIONAL ASSOCIATIONS

American Association of Colleges of Pharmacy—Charles B Jordan CLYDE M SNOW ROLAND T LAKEY  
 American Drug Manufacturers Association—Paul S Pittenger, F O TAYLOR  
 American Pharmaceutical Manufacturers Association—Frank B Kirby  
 National Association Boards of Pharmacy—Roy B Cook, H G RUENZEL  
 National Association of Retail Druggists—John W Dargavel THOMAS ROACH SAMUEL C HENRY  
 National Wholesale Druggists Association—E L Newcomb FRED W DOHRMAN  
 Proprietary Association—Delta E Combs

## STATE ASSOCIATIONS

Alabama—S A Williams, W E BINGHAM  
 Arkansas—P R Turner  
 California—Mrs W Bruce Philip  
 Colorado—Charles J Clayton  
 Connecticut—Alice Esther Garvin  
 District of Columbia—John William Lee  
 Florida—W M Hankins  
 Georgia—Robert C Wilson.  
 Illinois—Wm Gray

Indiana—F V McCullough, C E NELSON F W MEISSNER

Iowa—W F Meads, P J JEPSON J W SLOCUM.  
 Kansas—Ray C Reese FRANK A. MILNE A H KING  
 Kentucky—Gordon L Curry, GEORGE WILHELM J W GAYLE

Maine—Charles S Pierce  
 Maryland—Andrew F Ludwig, HARRY S HARRISON  
 Massachusetts—Carl G A Harring, WILLIAM E GLOVER

Michigan—Duncan Wesver, CLARE F ALLAN  
 Minnesota—Charles V Netz O NORDRUM  
 Mississippi—E L Hammond  
 Missouri—C E Caspari

Montana—L W Richards  
 Nebraska—Fred J Creutz  
 New Hampshire—Theodore J Brodley  
 New Jersey—Robert P Fischells

New York—F C A Schaefer  
 North Carolina—M L Jacobs  
 North Dakota—Nels N Brakke, WILLIAM H SCHEAM P H COSTELLO

Ohio—Frank H Fredericks, M N FORD CLAIR A DYE  
 Oklahoma—Elbert R Weaver Jr. THOMAS B CASEY D B R JOHNSON LOVD C HARRIS

Pennsylvania—Henry Brawa  
 Puerto Rico—H C Christensen, E F KELLY  
 Rhode Island—James J Gill, W HENRY RIVARD

South Carolina—J M Plaxco  
 South Dakota—Henry J Schnaidt, H A SASSE ROWLAND JONES

Texas—Walter D Adams  
 Vermont—O W McShane  
 Virginia—A L I Winne, JAMES M LEA W F RUDN W G CROCKETT

Washington—E V Lynn, RUSSELL A CAIN  
 West Virginia—J Lester Hayman ROY B COOK  
 Wisconsin—A H Uhl, R W CLARK.  
 Wyoming—R C Shultz

## THE COUNCIL

H V Army, T J Bradley W B Day, H A B Dunning, S L Hilton, C E Caspari, W Bruce Philip Rawland Jones E F Kelly, J W Slocum, E G Eherle A G DuMez

## FRATERNAL DELEGATES

Columbia University—H V Army  
 Brooklyn College of Pharmacy—Frederick C A. Schaefer  
 Drug Institute—Paul C Olsen

Fraternal delegates from Columbia University, University of Brooklyn College of Pharmacy and the Drug Institute, Inc., were recognized and brought greetings from these organizations.

Vice Chairman Costello presided while Chairman Slocum read his address. The address was received and referred to the Committee on Resolutions. (The address of Chairman Slocum is printed in the September JOURNAL, pages 861 to 864, the Resolutions bearing on the address are printed on page 879.)

Chairman Slocum appointed the following Committees. On Nominations, Chairman W D Adams, Texas, Frank A Milne, Kansas, M N Ford Ohio, Carl G A Harring, Massa-

chusetts, C J Clayton, Colorado, G L Curry, Kentucky, H H Schaefer, New York, J I Hayman, West Virginia, R B Rothrock, Indiana

On Resolutions, *Chairman*, W M Hankins, Florida, F J Creutz Nebraska, W E Bingham, Alabama, R P Fischelis, New Jersey, Thomas Roach, Oklahoma, C Leonard O'Connell, Pennsylvania, G W Mather, New York, George Judisch, Iowa, Rowland Jones, South Dakota

The Secretary made the suggestion that the Committee should hold an announced meeting and he offered to arrange for the rooms

Chairman S L Hilton of the Council read the annual report of the Council A Ph A, for 1932-1933, which was received

#### ANNUAL REPORT OF THE COUNCIL TO THE HOUSE OF DELEGATES

The proceedings of the Council are regularly published in the JOURNAL OF THE ASSOCIATION and this report is submitted to summarize them for the information of the House

The reorganization meeting of the Council for 1932-1933 was held in Toronto, Canada, on Friday, August 26 1932, following the final General Session of the ASSOCIATION The following officers were elected for the year S L Hilton, *Chairman*, C H LaWall, *Vice Chairman*, and E F Kelly, *Secretary* E G Eberle was elected *Editor of the JOURNAL*, A G DuMez *Editor of the YEAR BOOK*, S L Hilton, member of the *Commission on Proprietary Medicines* for a term of five years, J A Koch and Glenn L Jenkins, members of the *Committee on Research* for a term of five years, W F Sudro, H H Schaefer, H W Youngken and E L Newcomb, members of the *Committee on Unofficial Standards* for a term of four years The *Committee on Recipe Book* was continued for one year

The President was authorized to make such appointments as are now authorized, to fill vacancies as they may occur and to make additional appointments as may be necessary or desirable

The Chairman was authorized to appoint an executive committee of the Council should the occasion arise As a meeting of the Council or of an executive committee was not found necessary, in the interim, the business of the Council has been transacted by mail Ten Council Letters, covering 47 pages and submitting 77 items and 27 motions have been sent to members of the Council Among the more important items so transacted the following are mentioned

The resignation of Ambrose Hunsberger, nominee, as a candidate for the *Presidency* of the ASSOCIATION and of L L Walton, as a nominee for membership on the Council were accepted

Emerson D Stanley was chosen as *Local Secretary*, the Hotel Loraine as the Headquarters and the week of August 28th-September 2nd as the time for the 1933 meeting in Madison

The contract for printing and mailing the JOURNAL for 1933 was awarded to the Mack Printing Company

A budget of \$34 930 for the current expenses of the ASSOCIATION for 1933 was adopted. The budget for 1932 was \$39,525

The accounts of the ASSOCIATION for 1932 were audited by W A Johnson & Co, Certified Public Accountants, of Baltimore, Md, and their report, with a summary of the accounts was published in the JOURNAL for March 1933, pages 248-251

Permission to use the text of the N F V for partial reproduction was granted to a number of applicants, all at the usual charge of \$5 with the exception of the request of the N A R D which was granted without charge

208 applicants have been elected members through the payment of dues and 3 through subscriptions to the Headquarters Building Fund, and one applicant was elected a Life Member upon payment of \$100 6 members became Life Members through the payment of dues for thirty seven consecutive years and 4 through the payment of fixed sums in accordance with the By-Laws

The Council approved the program of this meeting in Madison and will appreciate suggestions for the improvement of the program of future meetings

\$275,000 of U S Treasury Bonds, 3% belonging to the Headquarters Building Fund were sold at 98½ to provide funds for the erection of the building under the terms of the contract reported at the 1932 meeting The building is practically completed and the cost is within the terms of the contract

The establishment of the North Pacific Local Branch at Portland, Ore , and of the Northern New Jersey Local Branch at Newark, N J , and of the University of California Student Branch, at San Francisco Calif , were approved These organizations will provide three strong additional branches

A resolution recording the earnest protest of the ASSOCIATION against any legislation permitting or requiring pharmacists to distribute beer and other alcoholic malt beverages in any form and of any higher alcoholic strength for beverage purposes, was adopted and given wide distribution

Chairman Hilton of the Council was authorized to act as *Treasurer* of the ASSOCIATION during the absence of Treasurer Holton who is abroad

An award of \$1000 for 1933-1934, was made from the Research Fund to Dr W J Husa, School of Pharmacy, University of Florida, Gainesville, Fla , to continue his study of extraction, on recommendation of the Committee on Pharmaceutical Research

The contract to print and distribute the YEAR BOOK, Volumes 20 and 21 in one binding, was awarded to the Lord Baltimore Press, Baltimore, Md which firm has had the contract covering Volumes 15 16, 17, 18 and 19 It is hoped to issue this combined volume during the fall and this procedure will bring the publication up-to date

The contract for printing and binding the National Formulary Sixth Edition was awarded to the Mack Printing Company, Easton, Penna , which firm had the contract covering the National Formulary, Fifth Edition The contract for the sixth edition represents a substantial saving as compared to that for the Fifth Edition

The second meeting of the Council was held in Madison on Monday, August 28th, at which the following business was transacted

Reports covering their activities for the year were received from the Committees on Finance on Property and Funds, on Standard Program, on the Recipe Book, on the National Formulary on Research, on Student Branches and on Publications Reports were also received from the Editor of the YEAR BOOK and from the Editor of the JOURNAL

These reports were given careful consideration and will be printed in the September issue of the JOURNAL They cover the property, funds and publications of the ASSOCIATION and show that the organization is in a sound condition

The Council nominated Dr Edward Kremers as *Honorary President*, E F Kelly as *Secretary* and C W Holton as *Treasurer* for the year 1933-1934, and these nominations will be submitted to the House for action in a separate communication

Twenty applicants were elected to membership at this meeting

The Third Meeting of the Council will be held on Thursday morning and a report of that meeting will be submitted later

Respectfully submitted,

S L HILTON, *Chairman*

The report of the Treasurer and of the Secretary were by consent deferred to the Second Session

The First Session of the House of Delegates was then adjourned

#### SECOND SESSION

The Second Session of the House of Delegates was convened by Chairman J W Slocum at 8 15 P M The chairman announced that the roll call would be omitted but that those who had not reported to the Secretary and were not present at the First Session of the House of Delegates were asked to present their credentials

Secretary Kelly read the minutes of the First Session of the House of Delegates (As stated these are not repeated as they are embodied in the transactions of the First Session) The minutes were approved The report of the Secretary was presented

#### REPORT OF THE SECRETARY

June 30, 1932, to June 30, 1933

The report of your Secretary will, as heretofore, be confined, as far as possible, to those

matters not covered in the reports of other officers and of the standing and special committees with all of whom the Secretary's office works in close contact

The ASSOCIATION year covered by this report has been an unusually busy and trying period. The ASSOCIATION, and the cause it serves, are to be congratulated that the unusual conditions through which we are passing have not affected them more unfavorably than, fortunately, has been the case. The ASSOCIATION's income and its membership have been reduced. It has been necessary to materially curtail its operating expenses and to defer certain efforts that should have been undertaken. It has not been necessary, however, to discontinue any important activity and several new lines of work were started.

For these very satisfactory results, the ASSOCIATION is indebted to those who planned and developed its sound financial structure and policy, to its faithful officers to its interested and loyal members, and to the cooperation of all with whom the ASSOCIATION has had to work during the year.

*The 1932 Meeting*—The joint meeting in Toronto with the Canadian Pharmaceutical Association was an unusual and very successful event. The presence of the official representatives of the British Pharmaceutical Society and other distinguished visitors, gave the meeting an international character. The gathering has already shown a favorable influence on the relations of the three national associations which is certain to benefit pharmacy in the English speaking world. Since that time, the Canadian Association has passed through a crisis with respect to health insurance the British Society has been almost completely reorganized by Act of Parliament and we have experienced changes of a fundamental character. It is now necessary to have international cooperation, and we have cause for satisfaction that our relations with the Canadian and British pharmaceutical organizations are so close and so helpful.

The pharmaceutical press of this country and of the world were generous in the space given to the Toronto meeting. I wish to again express appreciation for this cooperation, and for the helpful interest the American pharmaceutical publications have taken in our efforts during the year.

The proceedings of the meeting were reported in the August, September and October issues of our JOURNAL. As is our custom the addresses of the officers, the proceedings of the Council and the resolutions appeared in the first issue, the proceedings of the House of Delegates and of the General Sessions, and the proceedings of the A. A. C. P. and N. A. B. P. in the second, and the proceedings of the sections and Conferences in the third issue. Individual papers presented during the meeting follow throughout the year. By this procedure, a complete report of the proceedings reaches the members within three months of the annual meeting with the exception of the papers of which we now have such a number as to make their publication a question of importance. The number of papers presented and the greatly increased interest in the work of the sections are very encouraging. To meet the situation created by this increase is a problem which calls for brevity in speech and in writing.

Within a short time after the meeting, the resolutions adopted were sent to the publications, to the state and national associations, to boards of pharmacy, to the schools and colleges of pharmacy and to others interested, with the request that those resolutions of general interest be approved and supported. The request has been favorably acted upon, more generally than heretofore with the result that organized pharmacy is presenting a more uniform front with respect to the fundamental matters dealt with in the resolutions. May I again draw attention to the importance of the resolutions adopted by the ASSOCIATION and to the opportunity for leadership which they offer. An effort has been made to follow each resolution through and to see that its purpose is accomplished, so far as is possible. Time does not permit a report on each one but this can be made to the Committee on Resolutions. A number of the resolutions should be re-adopted so as to make their purpose effective.

*The 1933 Meeting*—Local Secretary Stanley and his associates and the pharmacists of Madison and of Wisconsin have had a difficult undertaking, on account of the conditions to carry through the arrangements for this meeting, and they deserve every commendation. The contributors and others who have cooperated so generously also deserve our appreciation.

Your Secretary, with President-Elect Swain, visited Madison in February and conferred with Local Secretary Stanley and his associates, and the general arrangements for the meeting were completed at that time.



The Committee on Standard Program, consisting of Chairman Hilton of the Council, Chairman Bradley of the Committee on Finance and the Secretary, have tried to work out a general program which will allow for the ever-increasing activities of the meeting with the least conflict. An additional session has been provided for the Scientific Section and the Section on Education and Legislation. In addition to the Joint Session of the Scientific Section and the Section on Practical Pharmacy and Dispensing on Thursday evening, a Joint Session of the Section on Education and Legislation and of the Conference of Secretaries and the Conference of Law Enforcement Officials has been arranged for that evening. The latter will be a Symposium on Legislation and should be helpful in condensing the time given to the consideration of legislation enacted and proposed during the year.

The Second General Session, this year, will be devoted to a Symposium on Professional Pharmacy and Its Development during the Year. The Chairmen of the U S P Committee of Revision, the National Formulary Committee and the Committee on Recipe Book are in charge of this session and have developed a program which will illustrate by lecture and exhibit, what is being done to promote the practice of pharmacy.

Chairman Slocum sent out a splendid appeal to the state associations to be represented in the House of Delegates, preferably by their presidents and secretaries. The response has been very encouraging and every effort should be made to have the House of Delegates function, as intended, as the clearing house of American Pharmacy. This can be accomplished only through the active interest and participation of the state associations.

Our general program is so complicated, that success requires strict adherence to it and prompt attendance at the various sessions.

*Pharmacy and the Government*—The Secretary has been required to give increased attention to this important division of our work and is pleased to briefly report the following developments.

The Office of Education, U S Department of the Interior, issued a revision of Guidance Leaflet No. 14, 'Pharmacy as a Career,' based on the four-year course and giving statistics about Schools and Colleges of Pharmacy and Boards of Pharmacy covering the calendar year of 1931. As previously reported, the ASSOCIATION had cooperated in the revision of the publication and had agreed to cooperate in providing a wide distribution of it. Unfortunately, the Congress increased the price of all governmental publications before the plan could be carried out. The Office of Education then secured permission for the ASSOCIATION to reprint the publication in full. Through the generous help of Mr. Carl Weeks, who distributed about 45,000, the reprints were made available at one cent each as originally planned and may be obtained from the ASSOCIATION at any time. It is planned to revise it from time to time. Thus our profession is provided with an authoritative statement of its position and functions, and the opportunities offered as a professional career. Every pharmaceutical agency, and particularly the schools and colleges, are requested to assist in giving this publication the widest possible distribution and the very low cost makes this reasonable.

The Veterans' Administration is proceeding with the reclassification of pharmacists in that branch as professional rather than as sub professional as heretofore. The restrictions on any salary increases is interfering to some extent with complete re-classification.

The Civil Service recently held the first examination for pharmacists based on the classification of pharmacy as a profession. Openings are very few, on account of government retrenchment, but the recognition is very helpful.

On account of financial conditions, no additional pharmacists have been commissioned in the Public Health Service and no progress has been possible toward legislation to commission pharmacists in the Army and the Navy. Conferences to this end have been continued as will be reported, and understandings have been reached which should bring about prompt and satisfactory results as soon as conditions improve.

For the ASSOCIATION and the National Drug Trade Conference, the Secretary has continued the efforts in connection with the draft of the Uniform State Narcotic Act which was adopted by the Conference of Commissioners on Uniform State Laws and approved by the American Bar Association last December. Representatives of pharmacy took an active part in the conferences and were able to secure some helpful additions and modifications in the draft. Other recommendations were not adopted, much to our regret. The draft of the Uniform Act

matters not covered in the reports of other officers and of the standing and special committees with all of whom the Secretary's office works in close contact

The ASSOCIATION year covered by this report has been an unusually busy and trying period. The ASSOCIATION, and the cause it serves, are to be congratulated that the unusual conditions through which we are passing have not affected them more unfavorably than, fortunately, has been the case. The ASSOCIATION'S income and its membership have been reduced. It has been necessary to materially curtail its operating expenses and to defer certain efforts that should have been undertaken. It has not been necessary, however, to discontinue any important activity and several new lines of work were started.

For these very satisfactory results, the ASSOCIATION is indebted to those who planned and developed its sound financial structure and policy, to its faithful officers, to its interested and loyal members, and to the coöperation of all with whom the ASSOCIATION has had to work during the year.

*The 1932 Meeting*—The joint meeting in Toronto with the Canadian Pharmaceutical Association was an unusual and very successful event. The presence of the official representatives of the British Pharmaceutical Society and other distinguished visitors, gave the meeting an international character. The gathering has already shown a favorable influence on the relations of the three national associations, which is certain to benefit pharmacy in the English speaking world. Since that time, the Canadian Association has passed through a crisis with respect to health insurance. The British Society has been almost completely reorganized by Act of Parliament and we have experienced changes of a fundamental character. It is now necessary to have international coöperation, and we have cause for satisfaction that our relations with the Canadian and British pharmaceutical organizations are so close and so helpful.

The pharmaceutical press of this country and of the world were generous in the space given to the Toronto meeting. I wish to again express appreciation for this coöperation, and for the helpful interest the American pharmaceutical publications have taken in our efforts during the year.

The proceedings of the meeting were reported in the August, September and October issues of our JOURNAL. As is our custom, the addresses of the officers, the proceedings of the Council and the resolutions appeared in the first issue, the proceedings of the House of Delegates and of the General Sessions, and the proceedings of the A. A. C. P. and N. A. B. P. in the second, and the proceedings of the sections and Conferences in the third issue. Individual papers presented during the meeting follow throughout the year. By this procedure a complete report of the proceedings reaches the members within three months of the annual meeting with the exception of the papers of which we now have such a number as to make their publication a question of importance. The number of papers presented and the greatly increased interest in the work of the sections are very encouraging. To meet the situation created by this increase is a problem which calls for brevity in speech and in writing.

Within a short time after the meeting the resolutions adopted were sent to the publications, to the state and national associations, to boards of pharmacy, to the schools and colleges of pharmacy and to others interested with the request that those resolutions of general interest be approved and supported. The request has been favorably acted upon, more generally than heretofore with the result that organized pharmacy is presenting a more uniform front with respect to the fundamental matters dealt with in the resolutions. May I again draw attention to the importance of the resolutions adopted by the ASSOCIATION and to the opportunity for leadership which they offer. An effort has been made to follow each resolution through and to see that its purpose is accomplished, so far as is possible. Time does not permit a report on each one but this can be made to the Committee on Resolutions. A number of the resolutions should be re-adopted so as to make their purpose effective.

*The 1933 Meeting*—Local Secretary Stanley and his associates and the pharmacists of Madison and of Wisconsin have had a difficult undertaking, on account of the conditions to carry through the arrangements for this meeting and they deserve every commendation. The contributors and others who have coöperated so generously, also deserve our appreciation.

Your Secretary, with President-Elect Swain, visited Madison in February and conferred with Local Secretary Stanley and his associates, and the general arrangements for the meeting were completed at that time.

The Committee on Standard Program, consisting of Chairman Hilton of the Council, Chairman Bradley of the Committee on Finance and the Secretary, have tried to work out a general program which will allow for the ever-increasing activities of the meeting with the least conflict. An additional session has been provided for the Scientific Section and the Section on Education and Legislation. In addition to the Joint Session of the Scientific Section and the Section on Practical Pharmacy and Dispensing on Thursday evening, a Joint Session of the Section on Education and Legislation and of the Conference of Secretaries and the Conference of Law Enforcement Officials has been arranged for that evening. The latter will be a Symposium on Legislation and should be helpful in condensing the time given to the consideration of legislation enacted and proposed during the year.

The Second General Session, this year, will be devoted to a Symposium on Professional Pharmacy and Its Development during the Year. The Chairmen of the U S P Committee of Revision, the National Formulary Committee and the Committee on Recipe Book are in charge of this session and have developed a program which will illustrate by lecture and exhibit, what is being done to promote the practice of pharmacy.

Chairman Slocum sent out a splendid appeal to the state associations to be represented in the House of Delegates, preferably by their presidents and secretaries. The response has been very encouraging and every effort should be made to have the House of Delegates function, as intended, as the clearing house of American Pharmacy. This can be accomplished only through the active interest and participation of the state associations.

Our general program is so complicated, that success requires strict adherence to it and prompt attendance at the various sessions.

*Pharmacy and the Government*—The Secretary has been required to give increased attention to this important division of our work, and is pleased to briefly report the following developments.

The Office of Education, U S Department of the Interior, issued a revision of Guidance Leaflet No. 14, "Pharmacy as a Career," based on the four-year course and giving statistics about Schools and Colleges of Pharmacy and Boards of Pharmacy covering the calendar year of 1931. As previously reported, the ASSOCIATION had cooperated in the revision of the publication and had agreed to cooperate in providing a wide distribution of it. Unfortunately, the Congress increased the price of all governmental publications before the plan could be carried out. The Office of Education then secured permission for the ASSOCIATION to reprint the publication in full. Through the generous help of Mr. Carl Weeks, who distributed about 45,000, the reprints were made available at one cent each as originally planned and may be obtained from the ASSOCIATION at any time. It is planned to revise it from time to time. Thus our profession is provided with an authoritative statement of its position and functions, and the opportunities offered as a professional career. Every pharmaceutical agency, and particularly the schools and colleges, are requested to assist in giving this publication the widest possible distribution and the very low cost makes this reasonable.

The Veterans' Administration is proceeding with the reclassification of pharmacists in that branch as professional rather than as sub professional as heretofore. The restrictions on any salary increases is interfering to some extent with complete reclassification.

The Civil Service recently held the first examination for pharmacists based on the classification of pharmacy as a profession. Openings are very few, on account of government retrenchment, but the recognition is very helpful.

On account of financial conditions, no additional pharmacists have been commissioned in the Public Health Service and no progress has been possible toward legislation to commission pharmacists in the Army and the Navy. Conferences to this end have been continued as will be reported, and understandings have been reached which should bring about prompt and satisfactory results as soon as conditions improve.

For the ASSOCIATION and the National Drug Trade Conference, the Secretary has continued the efforts in connection with the draft of the Uniform State Narcotic Act which was adopted by the Conference of Commissioners on Uniform State Laws and approved by the American Bar Association last December. Representatives of pharmacy took an active part in the conferences and were able to secure some helpful additions and modifications in the draft. Other recommendations were not adopted, much to our regret. The draft of the Uniform Act

went to the Governors and Legislatures of the several states promptly with the active support of the U. S. Bureau of Narcotics and was enacted by several legislatures. The National Drug Trade Conference sent out suggested amendments and in most cases the act was amended to meet the most serious objections. This is a question of real importance to the pharmacists of each state and should be given serious consideration by the members of this House.

At the request of the Department of Commerce, the ASSOCIATION has undertaken to print in four issues of the JOURNAL, July, August, September and October, the second report of the St. Louis Drug Store Survey dealing with professional pharmacy. It is entitled "The Professional Pharmacy"—An Analysis of Prescription Department Activities" and was prepared by F. A. Delgado, a member of this ASSOCIATION, and A. A. Kimball, Bureau of Foreign and Domestic Commerce. It will cover about 80 printed pages and will be furnished in reprint form with paper binding at 25 cents per copy, less 10% for six or more and less 20% for 100 or more.

This is a valuable report and deals exhaustively with the conduct of activities in drug stores of the professional type. It will be of interest to proprietors and as a textbook in schools and colleges.

The Secretary participated in the hearings on the regulations under the Celler Bill which removed many of the restrictions on the prescribing and dispensing of vinous and fermented liquors. The right of pharmacy to solely dispense such prescriptions was recognized in the regulations, but only after an effort to give the wineries and distilleries the right to supply directly where the pharmacist did not carry a sufficient supply. The effort is being continued and pharmacy must be on its guard not only in this matter but also to protect the profession from the results which may follow the abuse of the dispensing of alcoholic liquors. In this connection, it is recommended that the possibilities which may follow the repeal of the Eighteenth Amendment should be given consideration, and a policy determined if possible, for the ASSOCIATION to follow. This is, undoubtedly, a question of serious consequence to pharmacy as a profession.

The ASSOCIATION has taken part in conferences in connection with the proposed revision of the Food and Drugs Act. The revision proposed is far reaching in its professional as well as its industrial phases and pharmacy is very directly concerned. The standards for drugs and medicines is the most vital matter to the profession. It has been urged that some governmental agency should be set up to provide standards in place of the U. S. P. and N. F. and that the adoption of these publications as providing standards under the act may be unconstitutional. Fortunately the authorities do not agree with either suggestion and in the draft of the proposed revision have recognized the U. S. P. and N. F. even more definitely than in the present Act. Bills amending the act have been introduced in both houses of Congress and will come up for hearings when Congress convenes. Fortunately, the General Session tomorrow will be addressed by the Chief of the Food and Drug Administration who has been requested to discuss the proposed amendments in full. During this meeting they should be considered and some action taken with reference to them.

The situation brought about by the National Industrial Recovery Act and by the President's Agreement is too recent and too well known to require comment. It is probably true that the recognition of pharmacy as a profession and of pharmacists as professional persons by the President of the United States in his agreement is the most positive and definite that the profession has received, and should permanently settle its professional status in so far as the Government is concerned. The willingness of the authorities of the National Recovery Administration to exempt registered pharmacists, apprentice pharmacists and even messengers delivering medicinal products from the requirements of the Act and the Agreement with respect to hours of employment and wages, evidences how completely pharmaceutical practice was recognized as a professional service which must be free from the restrictions applicable to industries. Under this condition it was not necessary for the ASSOCIATION to take further action. The ASSOCIATION has cooperated in securing directly this recognition and has also cooperated with the National Association of Retail Druggists and other pharmaceutical associations, wherever possible, in connection with their codes of fair trade practice.

---

<sup>1</sup> See July JOURNAL 1933 page 671. (Address the JOURNAL 10 W. Chase St., Baltimore for the number wanted. A number of copies will be bound in cloth provided a sufficient number are ordered at \$1.00 per copy.)

This development has raised the question very definitely, whether drug stores can with permanent advantage, continue the expansion of their commercial activities in other commodities than drugs, medicines, medical supplies and related items. As a profession, pharmacy now has a definite governmental recognition and position. This may be put into question by increased commercial activities and the whole matter deserves careful thought.

The developments enumerated here indicate clearly the increased control which the Federal and State Governments are exercising over our profession and the industry back of it.

Our interests and the welfare of the public as entrusted to us, can be protected only through organization and conscientious intelligent leadership of the organization. Under the conditions which now exist our form of professional organization is not effective and this is a matter of paramount importance to pharmacists. To function effectively as a profession, there must be a closer affiliation of the state associations with the AMERICAN PHARMACEUTICAL ASSOCIATION and it is my hope that this question will have consideration at this meeting and that steps will be taken promptly to correct the present situation.

*Hospital Pharmacy*—The resolution passed at the Toronto meeting requesting the council on Medical Education and Hospitals of the American Medical Association to cooperate in providing proper supervision over hospital pharmacies, was forwarded to that body. Later, we were advised that the Council, in response, had taken the following action:

*Resolved* That a clause be inserted in the 'Essentials of a Registered Hospital' requiring that the pharmacy of a hospital be adequately supervised and should comply with state laws.

The revised 'Essentials of a Registered Hospital' have not been published but it will, no doubt, cover our views. If so, it will bring about the same professional control of hospital pharmacies as of other pharmacies and put both hospital and other pharmacies on the same basis.

There has been a marked increase in the membership of hospital pharmacists in the ASSOCIATION and the advisability of a Section on Hospital Pharmacy is raised from time to time.

The ASSOCIATION has continued its membership in the American Conference on Hospital Service and was again represented at its annual meeting in Chicago in February, by Messrs. Grey and Becker.

*The Report of the U S P N F Prescription Ingredient Survey*—This publication is now available in cloth binding and furnishes a comparison of the study recently completed and others made since 1880—of prescription ingredients.

This is another contribution the ASSOCIATION has made in this instance with the financial cooperation of the U S P Board of Trustees to the progress of professional pharmacy and to an accurate knowledge of the extent and character of pharmaceutical practice. Chairman Gathercoal of the Committee on National Formulary directed the Survey and the compilation and publishing of the report. It was a difficult and trying task and he deserves credit for this splendid contribution to pharmaceutical information.

*Relations with State and National Associations*—The President and the Secretary were unable to attend as many state association meetings this year as in previous years because of conditions and because of the attention that had to be almost constantly given to the Headquarters Building. However, President Philip delegated A. P. H. A. members to represent the ASSOCIATION at these meetings and to extend greetings.

Reports on the Toronto meeting were made at most state association meetings by their delegates. These reports were more complete and were very helpful in informing members of the state associations of the work of the A. P. H. A. The delegates to this meeting are urged to submit comprehensive reports at the next meeting of their associations. The data can be obtained from the JOURNALS of September, October and November and from the notes you will take during the meeting. An additional number of state associations have established sections for the consideration of professional pharmacy and greater attention is being given to the practice of pharmacy.

The A. P. H. A. has continued its representation in and cooperation with the National Drug Trade Conference, the Metric Association, the American Association for the Advancement of Science, the National Conference on Pharmaceutical Research, the American Conference on Hospital Service, the Committee on Pharmacy Exhibit at the Chicago World's Fair in 1933, the International Pharmaceutical Federation and the Inter-Society Color Council.

*Headquarters Building*—The building is now practically completed and ready to be furnished. The project has required much more attention than heretofore. The reports of the Committees on the Headquarters Building will give detailed information about the progress made.

All questions as to land have been satisfactorily settled with the Government during the year and the beautiful building and splendid location must be a source of pride to every member of the ASSOCIATION and to all who have contributed to this fine effort.

It is hoped to have the ASSOCIATION located in the new quarters by the first of the year.

*Membership*—The total membership on July 1, 1933, was lower by about ten per cent than on July 1, 1932. During the year, 42 members including 9 Life Members, have died. 87 have resigned and 674 have been suspended for the non payment of dues. During the year, 208 members were elected on payment of dues and 3 on account of contributions to the Headquarters Building Fund. Six members have become Life Members through the payment of dues for 37 consecutive years. Charles Leland Davis, Newburyport, Mass., Harry Matusow, Philadelphia, Pa., Cornelius Osseward, Seattle, Wash., Benjamin Rosenzweig, Brooklyn, N. Y., Mrs. Josie Wanous Stuart, Minneapolis, Minn., Theodore David Wetterstroem, Columbus, Ohio, and four through fixed payments in accordance with the By-Laws. Wilber Stanton Amos, Kansas City Mo., Ernest Godlove Eberhardt, Indianapolis, Ind., Arthur Schuh Metzger, Malden, Mo., Carl Stier, Paris, France.

The total membership is approximately 4250 and the suspensions will probably be higher unless financial conditions improve. An increasing number have found it difficult to keep up even the nominal dues, and we need cooperation in bringing in new members as rapidly as possible.

*Local Branches*—These organizations have kept up their programs very satisfactorily with one or two exceptions, and are to be commended for their fine efforts under present conditions.

The North Pacific Branch in Portland, Oregon, and the Northern New Jersey Branch, in Newark, N. J., were established during the year. The following branches were also active during the year: Baltimore, Cincinnati, Chicago, Detroit, New York, Northern Ohio at Cleveland, North western at Minneapolis, Philadelphia, Pittsburgh.

*Student Branches*—Student Branches at the Pittsburgh College of Pharmacy, South Dakota State College, State College of Washington, and at the Universities of Florida, Wisconsin, California and Western Reserve were active during the year. A Student Branch at the California College of Pharmacy was organized recently, and others are being organized.

These student organizations are doing splendid work and they should be established in other schools and colleges.

Representatives of several student branches are in attendance.

*Receipts of the Secretary's Office*—Attached are detailed financial statements of the receipts from January 1 to June 30, 1933, from Dues, the JOURNAL, the National Formulary, the Pharmaceutical Recipe Book, Bulletins, Proceedings, YEAR BOOKS, Badges and Bars, Buttons and Pins and Miscellaneous Items. Remittances to the Treasurer and the balance on hand are also set out.

The attached reports also give detailed information in reference to the printing, binding and sale of the National Formulary and the Pharmaceutical Recipe Book.

The Secretary's annual financial report for the calendar year 1932 was submitted with that of the Treasurer, and audited as provided for in the By-Laws.

#### SUMMARY OF RECEIPTS AND REMITTANCES, SECRETARY'S OFFICE, JANUARY 1 TO JUNE 30, 1933

##### *Receipts by Secretary*

Dues	
Membership only	\$ 112 00
Membership and JOURNAL, 1931	10 00
Membership and JOURNAL, 1932	247 00
Membership and JOURNAL, 1933	5592 92
Membership and JOURNAL, 1934	65 00
Membership and JOURNAL, 1935	5 00
Membership and JOURNAL, 1936	5 00
	<hr/>
	\$6036 92

JOURNAL	4235 71	
National Formulary	1381 40	
Recipe Book	278 00	
YEAR BOOKS	60 89	
Bulletins	1 80	
Interest on Deposit	5 86	
	<hr/>	
Total Receipts		\$12,000 58

*Remittances to Treasurer*

Jan 24, 1933, Check No 134	\$2229 01	
Mar 22, 1933, Check No 135	1328 78	
Mar 24, 1933, Check No 136	1430 51	
Apr 13, 1933, Check No 137	930 03	
Apr 29, 1933, Check No 138	658 71	
May 12, 1933, Check No 139	1075 87	
June 20, 1933, Check No 140	1722 57	9,375 48
	<hr/>	
Balance on Deposit, Baltimore Trust Co		\$ 2,625 10

## NATIONAL FORMULARY

## RECEIPTS AND DISBURSEMENTS ON ACCOUNT N F, JANUARY 1 TO DECEMBER 31, 1932

*Receipts*

Sales for quarter ending March 1, 1932, N F V	\$ 714 34	
Sales for quarter ending June 1, 1932, N F V	1084 80	
Sales for quarter ending September 1, 1932, N F V	811 20	
Sales for quarter ending December 1, 1932, N F V	1570 43	
Use of text during year	10 00	
Sales for year, Dec 1, 1931, to Nov 30, 1932, N F III	1 50	
Sales for year, Dec 1, 1931, to Nov 30, 1932, Bulletins N F V	51 00	
	<hr/>	
Total Receipts		\$ 4,243 27

*Disbursements*

N F V		
Expenses Exhibit Phila Meeting A M A	\$ 222 31	
Adley B Nichols Booklets	15 43	
N F VI		
E N Gathercoal, General and Traveling Expenses	407 94	
Samuelson Duplicating Co Bulletins, etc	635 59	
Plcher-Hamilton-Daily Co, Binders, etc	92 90	
H A Langenhan, Committee Expenses	195 00	
Glenn L Jenkins, Committee Expenses	304 20	
L A Engel Press, Printing	28 25	
Nat'l Confer Pharm Research, Membership	25 00	
W T Robinson, Letterheads	16 00	
Adley B Nichols, Postage, etc	8 86	
J A Dorgohn, Lettering N F Binders	16 50	
Merck & Company, Chemicals	7 22	
Ruth Bos, Clerical Services	112 00	\$ 2,087 20
	<hr/>	

## RECEIPTS AND DISBURSEMENTS ON ACCOUNT N F, JANUARY 1 TO JUNE 30, 1933

*Receipts*

Sales quarter ending March 1, 1933, N F V	\$1159 20	
Sales quarter ending June 1 1933, N F V	214 20	
Sales to June 30, 1933, N F III	1 50	
Sales to June 30, 1933, Bulletins N F VI	6 50	\$ 1,381 40

*Disbursements*

N F V		
Henry S McKeen & Son, Insurance	\$ 11 25	
Mack Printing Company, Printing and Binding	780 68	
N F VI		
E N Gathercoal, General and Traveling Expenses	298 49	
Samuelson Duplicating Co, Bulletins, etc	391 00	
Filcher Hamilton Daily Co Binders and Paper	106 36	
Glenn L Jenkins, Expenses Sub committee No 2	6 40	
H A Langenhan, Expenses Sub committee No 3	18 80	
Mrs L E Barnett, Clerical Services	120 00	
Gaw O Hara Envelope Company, Envelopes	41 86	\$ 1,774 84

## SUMMARY OF RECEIPTS AND DISBURSEMENTS ON ACCOUNT OF N F, JANUARY 1, 1926, TO JUNE 30 1933

*Receipts**Disbursements*

1926	\$45,318 21	1919-1920	\$ 1,038 89
1927	17,460 75	1921	1 169 98
1928	14 565 15	1922	404 21
1929	12,718 40	1923	227 72
1930	9 940 05	1924	95 59
1931	8,271 00	1925	236 30
1932	4,243 27	1926	20,857 09
1933 (to June 30)	1,381 40	1927	8 389 38
		1928	3,560 41
Total Receipts	\$113,898 23	1929	3 556 60
		1930	6,123 32
		1931	3,702 38
		1932	2,087 20
		1933 (to June 30)	1,774 84
			\$53,223 91

## SUMMARY OF SALES OF N F V—JANUARY 1 TO DECEMBER 31, 1932

Quarter Ending	Binding	Copies	Price	Amount.	Rec d by Secretary
Mar 1 1932	Buckram	387	\$2 40	\$ 928 80	
	Leather	0			
	Less freight and drayage			214 46	\$ 714 34
June 1, 1932	Buckram	450	2 40	1080 00	
	Leather	1	4 80	4 80	1,084 80
Sept 1, 1932	Buckram	338	2 40	811 20	
	Leather	0			811 20
Dec 1, 1932	Buckram	659	2 40	1581 60	
	Leather	0			
	Less freight and drayage			11 17	1,570 43
Total Sales for 1932					\$ 4,180 77



## SUMMARY OF SALES OF N F V—JANUARY 1 TO JUNE 1, 1933

Quarter Ending	Binding	Copies	Price	Amount.	Rec'd by Secretary
Mar 1, 1933	Buckram	483	\$2 40	\$1159 20	
	Leather	0			\$ 1,159 20
June 1, 1933	Buckram	93	2 40	223 20	
	Leather	1	4 80	4 80	
				228 00	
	Less freight and drayage			13 80	214 20
Total Sales for 1933 (to June 1)					\$ 1 373 40

## SUMMARY OF COPIES OF N F V—PRINTED AND BOUND TO JUNE 1 1933

Series	Buckram	Leather	Total
A	19,561	500	20,061
B	10 023		10,023
C	5 000		5,000
D	5 000		5,000
E	5 000		5 000
F	3,042		3,042
	47 626	500	48,126

## SUMMARY OF COPIES OF N F V—DISTRIBUTED COMPLIMENTARY SOLD AND HELD IN STOCK BY J B LIPPINCOTT COMPANY TO JUNE 1, 1933

	Buckram	Leather	Total
Copies used in copyrighting and for complimentary distribution through the Mack Printing Co	33	12	45
Copies distributed complimentary through the Chemical Catalog Co	32		32
Copies sold by the Chemical Catalog Co	18 021	107	18,128
Copies distributed complimentary through J B Lippincott Co	15		15
Copies sold by J B Lippincott Co	28 505	29	28,534
Copies held in stock by J B Lippincott Co	1 020	352	1,372
	47 626	500	48 126

## PHARMACEUTICAL RECIPE BOOK—SUMMARY OF RECEIPTS AND DISBURSEMENTS, P R B I

<i>Receipts</i>		1921	23 98
1929	\$5256 00	1922	42 93
1930	1920 98	1923	
1931	3641 80	1924	470 70
1932	1356 64	1925	572 47
1933 (to June 1)	278 00	1926	336 38
		1927	95 08
Total	\$12,453 42	1928	766 66
		1929	9838 65
		1930	51 00
		1931	61 96
		1932	
		1933 (to June 1)	8 63
<i>Disbursements</i>		Total	\$12 299 60
1917	\$ 10 50		
1918	19 26		
1919			
1920	1 40		

## SUMMARY OF SALES P R B I—JANUARY TO DECEMBER 31, 1932

Quarter Ending	Binding	Copies	Price	Amount.	Rec d by Secretary
Mar 1, 1932	Buckram	39	\$2 78	\$108 42	\$ 108 42
June 1, 1932	Buckram	275	2 78	764 50	764 50
Sept 1, 1932	Buckram	59	2 78	164 02	164 02
Dec 1, 1932	Buckram	115	2 78	319 70	319 70
Total					\$1356 64

## SUMMARY OF SALES OF P R B I—JANUARY 1 TO JUNE 1, 1933

Quarter Ending	Binding	Copies	Price	Amount.	Rec d by Secretary
Mar 1, 1933	Buckram	61	\$2 78	\$169 58	\$ 169 58
June 1, 1933	Buckram	39	2 78	108 42	108 42
Total					\$ 278 00

## SUMMARY OF COPIES OF P R B I—PRINTED AND BOUND TO JUNE 1, 1933

Series A	Buckram
	5000
SUMMARY OF COPIES OF P R B I—DISTRIBUTED COMPLIMENTARY, SOLD AND HELD IN STOCK BY J B LIPPINCOTT COMPANY TO JUNE 1, 1933	
Copies distributed complimentary	93
Copies sold	4487
Copies held in stock	420
Total	5000

## ACCOUNT OF YEAR BOOKS, PROCEEDINGS, BULLETINS

1 Sales	2 Expenses
1932	1932
1933 (to June 30)	1933 (to June 30)
Total	Total
\$1167 95	\$5052 92
62 69	66 07
\$1230 64	\$5118 99

E J KELLY Secretary

## TREASURER'S REPORT

The report of the Treasurer was presented It follows

REPORT OF THE TREASURER OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, C W HOLTON,  
TREASURER, JANUARY 1 TO JUNE 30, 1933

## PROPERTY AND FUNDS OF THE ASSOCIATION

	June 30 1932	June 30 1933
<i>Current</i>		
Savings and Checking Accounts	\$ 1,090 53	\$ 2 145 63
Secretary's Account Baltimore National Bank	972 03	2,625 10
Total	\$ 2,062 56	\$ 4 770 73
<i>Permanent</i>		
Endowment	\$ 14 340 42	\$ 14,921 12
Centennial	5 455 55	5 648 18
Ebert Legacy	7,792 32	8,117 32
Ebert Prize	1,081 54	1,072 85

Life Membership	42,046 89	42,106 74
Endowed Membership	125 00	129 20
Research	63,441 28	64,319 86
Headquarters Building, Certificate of Deposit, Bonds and Cash	301,149 88	74 582 18
Headquarters Building, Property	200,360 09	422,624 19
<b>Total</b>	<b>\$635,792 97</b>	<b>\$633,521 64</b>
<i>Trust</i>		
Procter Monument	\$ 16,349 57	\$ 16,982 82
Remington Honor Medal	1,368 18	1,314 41
<b>Total</b>	<b>\$ 17,717 75</b>	<b>\$ 18,297 23</b>
<i>Summary</i>		
Assets	\$637,855 53	\$638,292 37
Held in Trust	17,717 75	18,297 23
<b>Total</b>	<b>\$655,573 28</b>	<b>\$656,589 60</b>
Increase June 30, 1932 to June 30, 1933		\$ 1,016 32

The Merchants and Newark Trust Company The Maryland Trust Co and the Boston Penny Savings Bank opened after the bank holiday on a full basis The Baltimore Trust Company opened on a restricted basis and has since been reorganized as the Baltimore National Bank

SECURITIES, PROPERTY AND CASH HELD FOR THE ASSOCIATION AND FOR THE TRUST FUNDS,  
JUNE 30, 1933

*Securities*

Liberty Bonds, 4th issue, 4 $\frac{1}{4}$ %	\$ 44,500 00	
State of Massachusetts Bonds, 3%	14,000 00	
State of Tennessee Bonds, 4 $\frac{1}{2}$ %	3,000 00	
State of Illinois Bonds, 4%	6,000 00	
State of North Carolina Bonds, 4 $\frac{1}{2}$ %	7,000 00	
City of Baltimore, Md , Bonds, 4%	40,000 00	
City of Chattanooga, Tenn , Bonds, 4 $\frac{1}{2}$ %	8,000 00	
City of Dallas, Texas, Bonds, 4 $\frac{1}{2}$ %	11 000 00	
City of Newark, N J , Bonds, 4%	6 000 00	
City of Paterson, N J , Bonds, 4 $\frac{1}{4}$ %	1 000 00	
Chicago, Milwaukee, St Paul and Pacific R R Co Bonds, 5%	200 00	
Town of Montclair, N J , Bonds, 4 $\frac{1}{4}$ %	4,000 00	
Maryland Trust Co , Certificate of Deposit	67,111 81	
City of Detroit, Mich , Bonds, 4%	1 000 00	\$212,811 81

*Property*

Lots 3 4, 5, 7, 12, 13, 14, 15 16, 17 801 and 802, Square 62, Washington, D C	\$459 024 19	
Less Mortgage on Lot No 7	36,400 00	\$422,624 19

*Cash*

Boston Penny Savings Bank, Boston, Mass , Savings Account	\$ 402 06	
Merchants & Newark Trust Co , Newark, N J , Checking Account	1,755 85	
Baltimore Trust Co , Baltimore, Md , Checking Account	11,925 32	
Maryland Trust Co , Baltimore, Md , Savings Account, 2% Compounded semi annually	7,070 37	\$ 21,153 60
<b>Total</b>		<b>\$656,589 60</b>

Of the securities owned by the ASSOCIATION only one \$1000 bond of the City of Detroit, owned by the Life Membership Fund, has failed to pay interest to the amount of forty dollars (\$40)

The property entry represents the actual cost of the site in Washington, D C, for the Headquarters Building including recording, insurance of title and other incidental charges, advance payments on architects' and engineers' fees, etc Record should be made of the fact that the original deposit on the site, amounting to \$5000, was paid by Dr H A B Dunning personally and credited to his subscription, and therefore this amount does not appear in the bank deposits of the Headquarters Building Fund although it is included in the total of collections for the fund

The net total of subscriptions to the Headquarters Building Fund on June 30, 1933, was approximately the same as on July 1, 1932, \$817,156 43, and the total of collections including the \$5000 deposit toward the purchase of the site made by Dr H A B Dunning which was credited to his subscription, was \$506,024 30 The Chairman of the Campaign Committee will give further details in his annual report

The campaign has cost in total \$62 613 11 of which amount \$13,023 94 was spent in 1924, \$11,944 05 in 1925 \$10 007 06 in 1926, \$9297 31 in 1927, \$10,627 34 in 1928, \$3333 61 in 1929, \$1031 25 in 1930, \$1495 98 in 1931 \$1512 90 in 1932, and \$339 67 to June 30, 1933 The cost of the campaign has been paid from the interest on the fund and all collections have been used for the purchase of the site, to pay taxes and insurance, architects', engineers' and builders' fees, etc, or are in hand

The Secretary's report will show receipts from Dues the JOURNAL, the National Formulary, Recipe Book, YEAR BOOKS, Proceedings, Bulletins Badges and Bars, Buttons and Pins and Miscellaneous Items which are collected by him and deposited in the Secretary's account in the Baltimore National Bank These receipts are transferred by check, accompanied by itemized deposit slips, to the ASSOCIATION's checking account in the Merchants and Newark Trust Company from which all budget expenses are paid by voucher check

The annual report of the Treasurer for the calendar year 1932 was audited and approved by W Albert Johnson & Co —the auditors approved by the Council A summary of this report, together with the report of the auditors appears in the JOURNAL for March 1933, pages 248-251 and both reports will be published in full in the next YEAR BOOK

Respectfully submitted,

CHARLES W HOLTON, *Treasurer*

On motion duly made and seconded these reports were received

Chairman Slocum announced a deviation from the program by calling on Secretary Samuel C Henry of the N A R D to address the House of Delegates Mr Henry stated that sixteen years ago he had the privilege and honor of serving as Chairman of the House of Delegates and stated that American Pharmacy had made great progress during these years He referred to the chaotic conditions which prevail at the present time but admonished the leaders to keep their feet on the ground, their heads clear and move forward with a directness of purpose That at the present time there were all sorts of theories from persons who know little or nothing of history and who refuse to be guided by men who learned their lessons in the bitter school of experience In his opinion, when this day of storm and stress is past, when theory has been discarded and we have gone back to the principles upon which this great nation has survived and the principles which have made American Pharmacy what it is to day, in spite of criticism it will be a higher and nobler calling He hoped that as the years roll by the AMERICAN PHARMACEUTICAL ASSOCIATION and the House of Delegates may continue upon the course that has led up to the present high standing

Chairman Slocum thanked Mr Henry

Chairman Slocum then called on President-Elect Swain who had come from Washington during the week and was informed relative to the present status of the NRA code

#### REMARKS OF R L SWAIN RELATIVE TO THE PROGRESS OF THE NRA CODE

I am sorry that what I say may not be as stimulating and encouraging as the report of Treasurer *pro tem* Hilton Frankly, I am afraid my report will be largely of a negative character, but it will at any rate be, I hope, an authentic picture of the tremendously important drama which is now being played in the capital of this country

"I take it for granted that you are quite familiar with the general history of the develop

ment of codes in this country This whole effort to prepare codes of fair business practice is due entirely to the National Industrial Recovery Act which makes provision for codes to be developed by the various trades and industries of this country I shall pass up all of the preliminary features of this discussion and proceed immediately to the hearing in Washington on the code for the retail drug industry, the retail drug trade as it was called there, with an occasional reference to some of the preliminary work which was done about a week or ten days prior to the hearing on the code

"For some time there have been gatherings of various drug interests in Washington all engaged in the effort to ascertain, if we could ascertain, just what was the Government's intention so far as the filing of the retail druggists' code was concerned, just what principles it should espouse, and just what features it should ignore

"Of course you know that when the President issued his now famous President's agreement, referred to in Washington and elsewhere as the NRA, he established a blanket code for all industry It was recognized at the outset that it was virtually impossible for the retail drug store to operate under the forty hours established Mind you, the forty hours which was established in the President's agreement represents pretty nearly, I think, just what official Washington thinks industry should conform to Unless there was some good and sufficient reason for a longer period of hours per week all industry in the United States was supposed to operate under the forty hour week

You know that the grocers and food handlers were able to secure a forty eight-hour week That did not come, however, without some fight on their part Hearings were held, conferences were held, information and statistics obtained, and from a fair understanding of the function of the grocers and food handlers' trade a forty eight hour week was granted them

It appeared to us (when I say us I am referring to us collectively who were in Washington on the pharmacy reemployment agreement) that due to the peculiar form of the retail drug business, bearing in mind its long hours of service throughout the week, throughout every day of the week and every week of the year, we were faced with the absolute necessity of securing an extension under the President's reemployment agreement

"On August 1st, Mr W Bruce Philip, the President of the AMERICAN PHARMACEUTICAL ASSOCIATION, and Counsel for the National Association of Retail Druggists, Dr Kelly, and myself spent some time with the deputy administrator, Mr Whiteside who is in charge of retail codes, and we explained to him as forcefully and as effectively as we could some of the features of the retail drug store which we presumed he possibly did not know He requested us to present our data in some more permanent form than an oral statement, and we did

'This was followed up later by conferences with Mr Dargavel of the N A R D, Mr Philip Dr Kelly and others, and in a comparatively short while the retail druggists were granted an extension of forty eight hours a week That, too, required some little bit of an effort What I am trying to impress on you is that this forty hours a week was really very seriously intended and was deliberately meant to embrace every form of industry in this country unless there was some reason for it being taken out

The first three days of the week of August 21st were set aside for a hearing of what is known as the general retailers' code That code was subscribed to by the Retail Dry Goods Association, Retail Furniture Dealers Retail Hardware Association, Jewelers, and I think two or three others, and so far as the hours of labor are concerned that was based, I think, on a forty-four hour week, indicating some little bit of relaxation on the part of the administration as to just what this retail week should consist of

"I am advised (in fact, I think this came out at the general retail hearing) that certain groups even though they are theoretically signatories to this code, made the statement that it did not represent their views and it was not possible for them to operate under it, with the result that, while this code for all general purposes might be considered as authentic, at the same time it must be borne in mind that as referred to by the Government it is a tentative program

'I want to mention one point, because I shall not make an effort to deal with it all One of the most interesting and one of the most important, and probably one of the most troublesome features of the code is that it permits a mark up of ten per cent over invoice price Just remember that is one of the main features of this general retailers' code, a ten per cent mark up over the invoice price

"On Friday and Saturday of this past week the retail druggists hearing. Due notice of this had been given, and I would say that prior to the morning the code hearing began. In this gathering of 500 people of the stalwart workers in this field.

"The code was presented in the name of the National Association and the actual presentation of the code was preceded by a general statement was made to portray the basic features of the drug store as we know it given to the professional activities embraced within registration and education of attention was given to portraying the practical aspects and the public a drug store renders. This was followed by an actual reading of the code. Henry, and then the presentation of the data which we sought to rely upon this code adopted.

"I shall make no attempt to give you a full picture of what this hearing than to state that it was very carefully planned. A well thought out program and adhered to very largely. I regret I haven't a copy of that program, but statement of the economic conditions which now prevail. In summing up presented showing the actual conditions as they now obtain. Mr. Lester I fine statement, fine, I say, so far as its features were concerned, but very the actual import of conditions as they now exist in the state of West Virginia were brought in from other states, with the net result, I think, that it is probable that at least forty per cent of the retail drug stores of this country are closed risks and are virtually on a C O D basis.

"The hearing was also participated in by others who showed the retail drug store. Clerks were there representing a movement to unionize the drug store. The American Medical Association had a speaker there, Dr. Woodward representative of the A M A, to protest against certain features of our code were there, and others.

"One of the very finest statements made (and I will gloss over this very get at the things you are most interested in), and one of the most effective was by P. Fischelis, who brought to bear upon the hearing the great amount of work by the Committee on the Cost of Medical Care in so far as that referred to practice and its commercial importance.

"Dr. Fischelis showed that eighty-seven per cent of all the drugs handled in the United States were sold through retail drug stores. He pointed out that Professor Noyes of the United States Bureau of the Census figures and from them had established the fact that ninety-five per cent of all the drugs and medicines manufactured in the United States find their way to the ultimate consumer through the retail drug store. Dr. Fischelis also pointed out that of the total amount of retail business done in the United States in any calendar year, three and one-half per cent is done through retail drug stores. About one and one-half per cent is in the merchandising or non medical field.

"It was shown by Professor Ostlund of the University of Minnesota, department of economics, that the average salary paid to registered pharmacists in the United States is about \$1,000 per year, or \$75 per month, or \$18.75 per week.

"There was a great deal of other information presented, all of which had to do with the code which we had submitted. I shall not bother you with much of it, but I state that it is my view the hearing brought to light virtually every fact of the professional and economic nature which would enable the administrator, and through the President of the United States, to give intelligent approval to a code covering the retail drug stores.

"The hearing was held, as I say, on the twenty-fifth of August, and by noon he said he was going to adjourn the conference because it was apparent to him that the code as presented would not be approved in its entirety, and that it contained a great deal of which, while we were probably justified in asking for them, it was quite likely we would not get.

"I want you to bear in mind also that this code represented the composite of the codes as presented by the various state associations. The N A R D I U

very honest and conscientious effort to embody in this proposed code the best and the most eagerly sought after provisions that appeared in various state codes. I know I sat through all those hearings day after day and sometimes week after week, and I came to the very definite conclusion that the N A R D was not only anxious, but was most anxious, to prepare and present a code which would really be expressive of the conditions as they now prevail in the retail drug business, and equally expressive of what the retail druggist sought to have applied in meeting the problem.

"The code called specifically for the restriction and sale of drugs and medicine to pharmacists on public health grounds. It sought to take advantage of the present emergency and to attempt to restrict the future operation of drug stores to registered pharmacists. It has a whole series of unfair trade practices, all of which I dare say would commend themselves to you.

'The part of the code, though, that was considered the least likely of getting approval was a thing which to us seemed the most obvious, and that was the question of mark-up. The National Association of Retail Druggists' code called for a mark up of twenty eight per cent, which is actual cost of doing business as established by the St. Louis drug store survey, and other equally dependable economic studies, plus a five per cent profit. That was given absolutely no consideration beyond telling us that it didn't have the slightest chance of approval. At this point you want to bear in mind also that in the general retailers' code, which is applicable, if it is adopted, to about 670,000 retail establishments, calls for a ten per cent mark-up.

The code which I have here is the original N A R D code which died at noon, August 25th. Mr. Whiteside called a conference of twenty five or thirty people to meet around a large table in one of the rooms of the Chamber of Commerce of the United States, and attempted to explain just what his idea of the whole matter was. He made a frank statement that no retail group had come to Washington with any adequate conception at all of certain features of code making, and he particularly expressed the view that no one he had come in contact with at any rate, showed any proper understanding of what we call for the sake of argument, mark-up. Asked what his views were, he had none other than to state that he had some experts in the field of economics who were giving this thing close study and their earnest attention. We were asked to prepare a code with nothing from him except the statement that we had no intelligent understanding of what it was all about. He was fair enough to state that that applied equally well to all other persons who had come to Washington dealing in the retail field or any other field. None of them seemed to have any understanding of what should constitute mark-ups.

'Here is another code that is marked, 'Code of Fair Competition for the Retail Drug Trade as revised on August 26, 1933.' That went through the typewriter at five A M. on Saturday morning, August 26th. Here is a code finally revised, again on August 26th and read to the administrator about five thirty that afternoon.

'I think you would be interested in knowing the hours of labor, store hours and employees' hours, and I think you will find this is reasonably satisfactory. So you may get an understanding of it, I think I will read that store hours and employee hours, because so far as I know that is now in the code and I think has a very good chance of being approved. It will take but just a minute to read that, and you will understand exactly what I am getting at."

(Dr. Swann read the paragraph in the code relating to store hours and employee hours.) Commenting, he continued, "That means for stores open more than ninety hours a week their non registered employees would be given an average of fifty six hours a week.

"At the present time I think we can consider it as tentatively approved. At any rate that stores open more than ninety hours a week have their non registered employees on the basis of fifty six hours. Now, mind you, the retail grocers and food handlers' trade got a forty-eight hour week. We were granted fifty six hours a week, but only on the condition, and only when we agreed that the minimum rate of pay would be raised accordingly. Therefore, all employees working as much as fifty six hours a week would be paid not less than \$16 a week in towns of 500,000, and graduated down in proportion in accordance with the President's re-employment agreement.

I was discussing this yesterday morning with a member of the labor board, which has charge of this particular portion of our code, and while he would not permit himself to be quoted he led me to believe it was his opinion that the hours and wages in the code would be adopted. He also led me to believe however, that there was some question as to whether or not the exemp

"On Friday and Saturday of this past week the retail druggists were granted a public hearing. Due notice of this had been given, and I would say that probably 500 people were present the morning the code hearing began. In this gathering of 500 people were a great many of the stalwart workers in this field.

"The code was presented in the name of the National Association of Retail Druggists and the actual presentation of the code was preceded by a general statement in which an effort was made to portray the basic features of the drug store as we know it. Some attention was given to the professional activities embraced within registration and education, and a great deal of attention was given to portraying the practical aspects and the public health service which a drug store renders. This was followed by an actual reading of the code by Mr. Samuel C. Henry, and then the presentation of the data which we sought to rely upon as reasons for having this code adopted.

"I shall make no attempt to give you a full picture of what this hearing consisted of, other than to state that it was very carefully planned. A well thought out program was mapped out and adhered to very largely. I regret I haven't a copy of that program, but it covered a general statement of the economic conditions which now prevail. In summing up, statistics were presented showing the actual conditions as they now obtain. Mr. Lester Hayman presented a fine statement, fine, I say, so far as its features were concerned, but very depressing so far as the actual import of conditions as they now exist in the state of West Virginia. Similar reports were brought in from other states, with the net result, I think, that it is pretty well established that at least forty per cent of the retail drug stores of this country are considered bad credit risks and are virtually on a C O D basis.

"The hearing was also participated in by others who showed the social import of the drug store. Clerks were there representing a movement to unionize the drug clerks of the country. The American Medical Association had a speaker there, Dr. Woodward, the Washington representative of the A M A, to protest against certain features of our code. Cosmetic people were there, and others.

"One of the very finest statements made (and I will gloss over this very quickly so I can get at the things you are most interested in), and one of the most effective was by Dr. Robert P. Fischelis, who brought to bear upon the hearing the great amount of work which was done by the Committee on the Cost of Medical Care in so far as that referred to pharmaceutical practice and its commercial importance.

"Dr. Fischelis showed that eighty-seven per cent of all the drugs handled in the United States were sold through retail drug stores. He pointed out that Professor Nystrum, had taken the United States Bureau of the Census figures and from them had established the statement or fact that ninety-five per cent of all the drugs and medicines manufactured and sold in the United States find their way to the ultimate consumer through the retail drug store. Dr. Fischelis also pointed out that of the total amount of retail business done in the United States in any calendar year, three and one-half per cent is done through retail drug stores, and of this amount one and one-half per cent is in the merchandising or non medical field.

It was shown by Professor Ostlund of the University of Minnesota, department of economics, that the average salary paid to registered pharmacists in the United States was \$33.08 per week.

"There was a great deal of other information presented, all of which had a direct bearing upon the code which we had submitted. I shall not bother you with much of that, except to state that it is my view the hearing brought to light virtually every fact of importance of a professional and economic nature which would enable the administrator, and through him up to the President of the United States, to give intelligent approval to a code covering the governing of retail drug stores.

"The hearing was held, as I say, on the twenty-fifth of August, and by noon Mr. Whiteside said he was going to adjourn the conference because it was apparent to him that the code as it was presented would not be approved in its entirety, and that it contained a great many things which, while we were probably justified in asking for them, it was quite likely we would never get.

'I want you to bear in mind also that this code represented the composite view of most of the codes as presented by the various state associations. The N A R D I think made a



very honest and conscientious effort to embody in this proposed code the best and the most eagerly sought after provisions that appeared in various state codes. I know I sat through all those hearings day after day and sometimes week after week, and I came to the very definite conclusion that the N A R D was not only anxious, but was most anxious, to prepare and present a code which would really be expressive of the conditions as they now prevail in the retail drug business, and equally expressive of what the retail druggist sought to have applied in meeting the problem.

"The code called specifically for the restriction and sale of drugs and medicine to pharmacists on public health grounds. It sought to take advantage of the present emergency and to attempt to restrict the future operation of drug stores to registered pharmacists. It has a whole series of unfair trade practices all of which I dare say would commend themselves to you.

"The part of the code, though, that was considered the least likely of getting approval was a thing which to us seemed the most obvious, and that was the question of mark up. The National Association of Retail Druggists' code called for a mark up of twenty eight per cent, which is actual cost of doing business as established by the St. Louis drug store survey, and other equally dependable economic studies, plus a five per cent profit. That was given absolutely no consideration beyond telling us that it didn't have the slightest chance of approval. At this point you want to bear in mind also that in the general retailers' code, which is applicable, if it is adopted, to about 670,000 retail establishments, calls for a ten per cent mark-up.

"The code which I have here is the original N A R D code which died at noon, August 25th. Mr. Whiteside called a conference of twenty five or thirty people to meet around a large table in one of the rooms of the Chamber of Commerce of the United States, and attempted to explain just what his idea of the whole matter was. He made a frank statement that no retail group had come to Washington with any adequate conception at all of certain features of code making, and he particularly expressed the view that no one he had come in contact with, at any rate, showed any proper understanding of what we call, for the sake of argument, mark up. Asked what his views were, he had none other than to state that he had some experts in the field of economics who were giving this thing close study and their earnest attention. We were asked to prepare a code with nothing from him except the statement that we had no intelligent understanding of what it was all about. He was fair enough to state that that applied equally well to all other persons who had come to Washington dealing in the retail field or any other field. None of them seemed to have any understanding of what should constitute mark ups.

"Here is another code that is marked, Code of Fair Competition for the Retail Drug Trade as revised on August 26, 1933. That went through the typewriter at five A M. on Saturday morning, August 26th. Here is a code finally revised, again on August 26th, and read to the administrator about five thirty that afternoon.

"I think you would be interested in knowing the hours of labor, store hours and employees' hours, and I think you will find this is reasonably satisfactory. So you may get an understanding of it, I think I will read that, store hours and employee hours, because so far as I know that is now in the code and I think has a very good chance of being approved. It will take but just a minute to read that, and you will understand exactly what I am getting at."

(Dr. Swain read the paragraph in the code relating to store hours and employee hours.) Commenting, he continued, "That means for stores open more than ninety hours a week their non registered employees would be given an average of fifty six hours a week.

"At the present time I think we can consider it as tentatively approved. At any rate, that stores open more than ninety hours a week have their non registered employees on the basis of fifty-six hours. Now, mind you, the retail grocers and food handlers' trade got a forty-eight hour week. We were granted fifty six hours a week, but only on the condition, and only when we agreed that the minimum rate of pay would be raised accordingly. Therefore, all employees working as much as fifty six hours a week would be paid not less than \$16 a week in towns of 500,000, and graduated down in proportion in accordance with the President's re-employment agreement.

"I was discussing this yesterday morning with a member of the labor board, which has charge of this particular portion of our code, and while he would not permit himself to be quoted he led me to believe it was his opinion that the hours and wages in the code would be adopted. He also led me to believe however that there was some question as to whether or not the exemp

tions of registered assistant pharmacists and apprentice pharmacists would be maintained. Certainly he was rather of the opinion they would not be maintained in the present language of the code, although he felt that whatever modification was made would be comparatively unimportant and might be perfectly acceptable to us.

So I think we can say that up to the present time, at any rate, our code has been tentatively approved so far as hours and wages are concerned, and the exemptions.

When we found out that the twenty eight per cent plus five per cent, was entirely out of order Mr Goode of the National Association of Retail Druggists divided the general committee into three groups: a legal committee, a committee on fair-trade practices, and a committee on hours and wages. I don't recall the personnel of these committees, but the committee on fair-trade practices worked the larger part of Friday night until three, four or five o'clock Saturday morning. During this time they went to Mr Whiteside's apartment in the Shoreham Hotel to discuss certain features and phases of the work as they progressed.

At that meeting the committee established a principle which I think represented about all they could possibly do in the way of a concession in price. I will read it to you as it now stands in the code. This is Article VIII."

(Dr Swain read the article.) He continued:

I want you to note how far Mr Goode's committee felt obliged to go to meet Mr Whiteside's criticism. The first code asked for twenty eight per cent, the cost of overhead, plus five per cent profit.

This code comes in and says a \$1 article may be sold for 79 cents. I think you will all agree that was about as far as anybody could go who knew conditions as they prevailed in the retail drug store.

The day after that was given out the Consumers' League came out and said this was a price-fixing plan, a most revolutionary idea and totally unacceptable. They said the ten per cent was also price fixing and so far as the Consumers' League was concerned there would be no such thing.

I have a whole series of newspaper clippings (they were torn out rather than clipped out), all of which show the newspaper comments as they have been coming out in Washington for the last two or three days.

To bring the thing up to-date without taking any more of your time, because I realize this is not on the program, if I were asked to give you what is my honest, candid belief of the situation as it now obtains in Washington or as it obtained yesterday afternoon at three o'clock I should say we have a very good chance of obtaining a schedule of wages and hours as set out in the code. I think we also have a fairly good chance of maintaining the exceptions and exemptions as I have read them to you, and what is most encouraging of all the right of contract, which is submitted as the Capper-Kelly Bill does for some strange reason seem to have gotten approval in Washington. It is borne out by the members there that Mr Whiteside said in his closing remarks at the public hearing that he had discussed the right of contract with the powers that be in the National Recovery Administration and they were disposed to approve it. That was on Saturday. I didn't get a great deal of encouragement out of that until I ran across the same feeling on Tuesday. When a thing lasts three or four days in Washington it is pretty good. I mean that because the scene changes so quickly you simply don't know where you are. But when a group of us called on the officials at the administrator's office on Tuesday morning and Tuesday afternoon we were led to believe that the right of contract would be approved. At any rate it was not under fire at that particular time.

At the present time, I am inclined to feel that is the actual situation because I have here the closing remarks made by Mr Whiteside at the public hearing on Saturday. I shall not read it all to you although it is really quite a remarkable statement at that.

This statement was made by Mr Whiteside at the close of the public hearing."

(Dr Swain read Mr Whiteside's closing statement made at the public hearing.) He continued:

'I am passing Administrator Whiteside's statement to you with the comment that I believe it represents his honest opinion that it represents his desires, and I am extremely hopeful that it is indicative of the viewpoint of the administration.

'Yesterday morning Mr Whiteside told a group in his office that as far as he was con-

cerned he was tired, that he was mentally and physically worn out, and that he would desire to have two or three more days to study this whole thing, and he suggested that all of us go home and forget all about it, and come back on the sixth of September

"I don't know exactly what to tell you When I picked up the paper after I got on the train for Chicago last night, I found a reference in the *Washington Evening Star* which is a bit disturbing I tore it out It occurs under the code dealing with the coal industry, and here is a significant paragraph

" 'The wind up on coal left one really big agreement to be concluded, a code to embrace the country's entire retail trade with its employment of millions of persons Strenuous effort continued to day to bring the separate codes of the dry goods retail groups and of the druggists into line so as to permit covering every store in the country under one blanket retail agreement Deputy Administrator Arthur D Whiteside in charge of the endeavor, was highly hopeful he would conclude the task by Labor Day, which is designated as the climax date for the Blue Eagle campaign '

'To those who have been working in Washington, it is rather evident that at the present time, at any rate, the Government is considering a blanket retail code Newspaper reports indicate it, contacts with administrative officials indicate it and it may be when the retail groups come back to Washington on September 6th they will be faced with the necessity of finding their way about and conducting their business under this general retailers' code

' If that is done, I believe the schedule of wages and hours I read to you will be maintained and I am rather inclined to feel that the right of contract will be expressed in the general retailers' code

I doubt very much whether I have given you anything except a rather jumbled portrayal of what took place in Washington, what the situation actually was when I left there yesterday afternoon

' I do want to pay my tribute—and I say this very, very sincerely because I know some little bit about some of the privations this group underwent, and I know somewhat of the hours that began early in the morning and wound up at four and five o'clock the next morning—and to say that I have never in my life been a participant in any movement which was more earnestly fought out which was more conscious of its vast responsibility, and which was more eager to really work out something which would help meet the problems which confront the retail drug industry of this country The spokesman for it was Mr Goode, President of the National Association of Retail Druggists He was supported, as best we could by representatives of other associations, and we were all, as I said before, struggling to bring out of this exceedingly confusing, chaotic situation something which might be depended upon to meet the economic distress which unfortunately persists in our industry I can only voice the hope that the prediction which I have made to you will turn out to be fact "

Chairman Slocum thanked Dr Swain for his report

Chairman Slocum called for reports and other communications from the ASSOCIATION, the Council and the Sections There being no reports from these bodies, Chairman Slocum called for the report of the Committee on Legislation which was read by Dr S L Hilton (The report was referred to the Committee on Resolutions and action duly taken on its report—it will be printed under "Committee Reports" in this or a succeeding issue of the JOURNAL )

Chairman Slocum advised that there will be a minority report by Mrs W Bruce Philip In the presentation, Mrs Philip enlarged on some of the points of her report She also discussed points of the code

Chairman Slocum asked for action on the minority report S L Hilton contended that the presentation was not a minority report, it dealt with legislative matters, primarily, with the California law, and he moved that both the majority and the minority reports be referred to the Committee on Resolution After some further discussion a vote was called for and the motion carried

The report of the Chairman of the Committee on Pharmacy Week was presented by Chairman Anton Hogstad Chairman Slocum thanked Dr Hogstad for his interesting report (The report will be printed under Committee Reports in this or a succeeding issue of the JOURNAL )

Secretary Kelly read the report of the Council on the Nomination of Honorary President, Secretary and Treasurer

Dr Edward Kremers of Madison, Wisconsin, was named for *Honorary President*, E F Kelly of Baltimore for *Secretary* and C W Holton of Essex Fells, N J, for *Treasurer* Chairman Slocum called for action on the report and on motion of Walter D Adams, seconded by S L Hilton, a vote was called for The nominees were elected unanimously

The Committee on Nominations presented the names of P H Costello of North Dakota for Chairman of the House of Delegates and S A Williams of Alabama for Vice Chairman On motion duly seconded and carried the *Secretary* was requested to cast the ballot of the House of Delegates for the nominees There being no objection Secretary Kelly announced that he had cast a unanimous ballot of the House of Delegates for the election of P H Costello of North Dakota as Chairman and S A Williams of Alabama as Vice-Chairman

The Committee on Transportation was called for It follows

#### REPORT OF THE COMMITTEE ON TRANSPORTATION

The duties of the Committee on Transportation are of an executive character and do not call for the preparation or presentation of an elaborate report

This committee was revived in 1929, and, during the past five years has been able to make arrangements with the railroads which, in the aggregate, have saved many thousands of dollars for the members attending the meetings in Rapid City, Baltimore, Miami, Toronto and Madison This year we secured the very favorable rate of one and one third times the single fare to Madison and return, either from the members' homes or from Chicago in connection with special exposition excursion tickets Also diverse routes may be used going and returning on the reduced rate tickets between our homes and Madison

The railroads are much more reasonable in their requirements than they were a few years ago, but there are many formalities to be observed if we are to receive the full benefit of the concessions It has been the constant effort of the Committee to secure all possible concessions, and our work has become more and more effective with our increasing experience in it  
Madison, September 1, 1933

T J BRADLEY, *Chairman*

Chairman Bradley stated that the Committee on Place of Meeting had substantially been the same for the past fifteen years and this Committee had laid out a definite plan with logical sequences of places and he explained the manner of selection Occasionally—there must be deviation for one reason or another as this year on account of the Fair in Chicago instead of meeting in the far Northwest the meeting was being held in Wisconsin He explained that another deviation from the general plan may occur in the selection for next year on account of the dedication of the Headquarters Building, and this has prompted the Committee to report for Washington for the 1934 meeting, and the nomination for the place of meeting in 1935 in the Northwest would have to be deferred

On motion made by Walter D Adams, and duly seconded, the report of the Committee was accepted and Washington was selected for the 1934 meeting

The report of the Committee on Cosmetics was presented and accepted It follows

#### THE COMMITTEE ON COSMETICS

*To the House of Delegates of the American Pharmaceutical Association*

We have continued to the best of our ability, to follow the literature of cosmetic chemistry and toxicology, and find therein a trend toward a demand for stricter regulation of the manufacture and sale of cosmetics We believe that the burden of proof of the harmlessness of cosmetic agents rests upon the manufacturers of cosmetics and that when there is any doubt as to the safety of any such agent it ought to be investigated under their auspices We do not find in modern literature evidence of determined efforts to establish these facts, such as has been done by manufacturers of aluminized baking powder or of aluminum cooking utensils Possibly some of the recent writings of dermatologists have been inspired, but most of the publications are in the direction of the improvement of dermatologic practice

With the inclusion of cosmetic agents in the amended Food and Drugs Act, we believe it desirable for the ASSOCIATION for a time at least, to continue a Committee on Cosmetics, both to advise this ASSOCIATION and to cooperate with other commercial and professional associations in securing correct and reasonable interpretations of departmental decisions We believe that

manufacturers and dealers generally will welcome the throwing of safeguards around the manufacture and use of cosmetics, to the end that the public may be better protected

Respectfully submitted,  
GEO D BEAL, *Chairman*,  
F W NITARDY

The Second Session of the House of Delegates was then adjourned

### THIRD SESSION

The Third Session of the House of Delegates was called to order by Chairman Slocum at 9 20 A M The minutes of the Second Session were read by Secretary Kelly and approved The report of the Section on Education and Legislation was read and accepted, it follows

#### REPORT OF THE SECTION ON EDUCATION AND LEGISLATION

The meeting of the Section on Education and Legislation on August 30th was called to order by Chairman Rivard at 2 25 P M in the Hotel Loraine

Five of the eight papers listed were presented, discussed and upon motion offered for publication The remaining three papers were not presented because of withdrawal of title and non-receipt by the Secretary

The Committee on Nominations presented the following report on officers, 1933-1934: *Chairman*, G C Schicks New Jersey, *Vice Chairman* O E Russell, Indiana, *Secretary*, C W Ballard, New York, *Delegate to the House of Delegates*, W H Rivard, Rhode Island

Upon motion these officers were duly elected and installed

The joint meeting of this Section with the Conferences of Law Enforcement Officials and the State Association Secretaries, held August 31st, at Hotel Loraine was called to order by Chairman Rivard at 8 15 P M, with 49 members present

Chairman Rivard opened the meeting with general remarks as to its purpose

Reports were rendered by representatives of 18 states dealing with enacted and proposed legislation affecting pharmacy Two papers dealing with legislative matters were read and discussed

Upon motion duly carried it was resolved to request a continuance of this Joint Session The Joint Session was adjourned at 11 20 P M

R H RAABE, *Delegate*

Secretary Kelly read a letter from the President of the Porto Rico Pharmaceutical Association expressing greetings and asking that Secretary Kelly and Secretary H C Christensen act as their representatives On motion duly seconded their wishes were complied with

Chairman J L Hayman, being called upon by Chairman Slocum, stated that the Conference of State Pharmaceutical Association Secretaries had a surplus in its treasury, and by motion \$50 was donated to the Pharmacy Exhibit at Chicago

Chairman Slocum gave others the opportunity for making donations

Chairman Robert P Fischelis invited those who had resolutions to present to do so after the conclusion of this session

The report of the Committee on Pharmacy Corps was called for, it was presented by Chairman R L Swain, it follows

#### REPORT OF COMMITTEE ON PHARMACY CORPS

Recognizing the inadequacy of the pharmaceutical service in the United States Army, the AMERICAN PHARMACEUTICAL ASSOCIATION many years ago established a Committee on the Status of Pharmacy in the Government Service, for the purpose of studying the whole matter with the ultimate view of creating in the army a professional pharmaceutical personnel, based on the standard of competency demanded by the laws of the several States This committee carried on an effective work for some years, in which contacts were established with the Medical Department and other branches of the Federal Government However, due to a change in the viewpoint of the ASSOCIATION, this first committee was discontinued, and a Committee on the Pharmacy Corps in the United States Army was formed This latter committee was charged with the duty of drawing up suitable legislation for the establishment in the United States Army of a Pharmacy Corps, which would be responsible for the maintenance of satisfactory professional work in this

branch of the nation's defensive forces. In due course, such a bill was introduced, and was sponsored by Congressman Clyde Kelly of Pennsylvania, and Senator Royal S. Copeland of New York. Aggressive pharmaceutical support was given this bill. It received the endorsement of every State and National pharmaceutical organization as well as that of the National Drug Trade Conference. A hearing was accorded by the Military Affairs Committee of the House of Representatives, at which the cause of pharmacy was presented with consummate skill. Conditions as they actually exist were portrayed to the committee, and the glaring defects in the present system were pointed out. While no definite action was taken by the committee, it was apparent that our case had been presented with great force, and in a convincing manner.

The following summer there was a change in the Medical Department of the Army, Surgeon General Patterson having succeeded Surgeon General Ireland. This change necessarily set back our program, as it was essential that Surgeon General Patterson be made familiar with our objectives, the reasons upon which they rested and the progress which had been made. At this point I desire to record the very definite impression that the members of this committee feel that Surgeon General Patterson soon became alive to the importance of the position taken by the AMERICAN PHARMACEUTICAL ASSOCIATION, and he pledged his best efforts to bring about the necessary changes as soon as possible. At this time, Surgeon General Patterson was interested in legislation to provide a general reorganization of the medical service of the army which would provide an increase in professional personnel in addition to a more unified and better classified unit. In pursuance of his official plan the Surgeon General announced disapproval of a separate pharmacy corps, and expressed his preference that pharmacy be placed in the Medical Administration Corps, in which the various medical specialties would be grouped. Surgeon General Patterson also expressed his disapproval of separate action by pharmacy to attain a distinct pharmacy corps. He referred to this as piecemeal legislation, and said that he would regard it as inimical to his general plan for an improved medical service. In the conference with him and his advisers, immediately before the meeting of this ASSOCIATION at Toronto last year, Surgeon General Patterson reiterated his promise to aid in securing proper legislation as soon as possible and on this occasion he again expressed his approval of the ASSOCIATION'S activities in behalf of an adequate pharmaceutical service in the army, and asked that his office be informed as to our plans, and that the ASSOCIATION continue to maintain contacts with him until a satisfactory outcome could be brought about.

A few weeks ago, a conference was had with Surgeon General Patterson and his advisers. This meeting was attended by Dr. E. F. Kelly, Dr. Samuel L. Hilton and Robert L. Swain. The whole situation was surveyed and brought up-to-date. The Surgeon General reaffirmed his previously expressed views and again expressed approval of our activities.

It is deeply regretted by this committee that our objective is still so indefinite so far as realization is concerned. However in view of the financial crisis which has faced the Federal Government, and in view also of the reduction made in the personnel of the various departments of the Government including the Medical Department of the Army, this committee has not seen fit to take any aggressive stand during the past year. This position seemed the only sound one in face of the peculiar conditions existing, but was not finally decided upon until prominent members of both houses of Congress had expressed the belief that our cause would be put in a false light, and perhaps greatly injured if any plan was adopted which might be misunderstood as unfriendly to the Administration's retrenchment program. For these reasons, the committee has largely marked time during the past year, and has deferred to those considerations which seemed to point out the dangers of any other course.

In conclusion the retiring committee strongly recommends that the AMERICAN PHARMACEUTICAL ASSOCIATION continue a Committee on Pharmacy Corps in the United States Army that the committee be instructed to continue its contacts with the Surgeon General, and that it be authorized to adopt such other plans as will best serve to bring about an adequate and thoroughly satisfactory pharmaceutical service in the United States Army.

ROBERT L. SWAIN, *Chairman*

Secretary Kelly hoped that interest would not be lost in this important movement because of present conditions. He stated that commissions for pharmacists in Public Health Service had worked out very satisfactorily, and that it was equally important to have pharmacists commissioned in the Army.

Chairman Slocum thanked Dr. Swain, the report was accepted.

The report on the U S Pharmacopoeia was called for. There was no report at this time. Secretary Kelly reported progress for the Committee on the Study of Pharmacy. "The Council on Pharmaceutical Education has been organized and is functioning," he said. This body made a report to the Council, it is taking over part of the work which the Committee on the Study of Pharmacy was to cover.

Chairman Hugo H. Schaefer presented the report of the Committee on Tolerances. President Philip spoke of the importance of this work. The report was accepted. It follows:

#### REPORT OF THE COMMITTEE ON TOLERANCES

Your Committee on Tolerances consisting of Messrs. Hilton, Swain and myself soon after its appointment last November found that the problem confronting them was a huge one. Each of the great number of operations involved in compounding prescriptions requires a separate study in order to determine what constitutes a reasonable tolerance. The chief factors to be studied are:

- (a) Moisture and allowable impurities in chemicals
- (b) Decomposition and deterioration
- (c) Unavoidable errors in the weight of individual powders, pills or capsules
- (d) Unavoidable losses due to a portion of the prescription ingredients remaining in the mortar or adhering to utensils
- (e) Unavoidable errors in weighing and measuring

The third of these problems is the one with which your Committee has been most active. The Boards of Pharmacy of a number of States have agreed to include certain suggested simple powder prescriptions in their practical examinations and to forward the finished products to members of our Committee who will check the weights and determine the differences in weights of the individual powders. The same prescription will also be compounded in a large number of pharmacies throughout the country and checked by our Committee.

At the suggestion of Dr. E. N. Gathercoal, *Chairman* of the N. F. Committee, Drs. Swain, Kelly, Krantz and Briggs have been appointed as a Sub Committee to develop tolerances for certain capsules which may be included in the new N. F. and at the same time consider tolerances for capsules compounded in regular prescription work. The data obtained along these lines is not, however, considered sufficiently extensive as yet for publication or for warranting definite recommendations. Your Chairman is also tabulating the results of the analyses of thousands of prescriptions collected by Board of Pharmacy Inspectors and analyzed by him.

On May 1, 1933, your Committee had a conference in Washington with Dr. W. G. Campbell, Chief of the Bureau of Food and Drug Administration, U. S. Department of Agriculture. Dr. Campbell showed great interest in the work and objects of our Committee and offered his full cooperation.

During May a news Bulletin was prepared by our Committee on the general subject of Prescription Tolerances and copies were sent by Secretary Kelly to pharmaceutical publications, to the presidents and secretaries of State Pharmaceutical Associations and to the secretaries of Boards of Pharmacy. A number of replies were received showing a considerable interest in the subject.

As stated earlier in this report the subject is a huge one and the surface has only been scratched. A wide sphere of cooperation must be sought and obtained in order to collect the material for study.

S. L. HILTON,  
ROBERT L. SWAIN,  
HUGO H. SCHAEFER, *Chairman*

The report of the Chairman of the Pharmaceutical Syllabus, owing to the absence of Chairman J. G. Beard, was read by H. M. Burlage. After discussion the report was received and referred to the American Council on Pharmaceutical Education. It will be printed under 'Committee Reports' in a later issue of the JOURNAL.

The report of the Committee on William Procter, Jr. Memorial Fund was read by Secretary Kelly who gave a brief history of the Fund and the recent considerations. The statue will be placed in Memorial Hall of the Headquarters Building. It is not planned to have any other statues or pictures in the Hall at present. The report was accepted, it follows:

branch of the nation's defensive forces. In due course, such a bill was introduced, and was sponsored by Congressman Clyde Kelly of Pennsylvania, and Senator Royal S. Copeland of New York. Aggressive pharmaceutical support was given this bill. It received the endorsement of every State and National pharmaceutical organization as well as that of the National Drug Trade Conference. A hearing was accorded by the Military Affairs Committee of the House of Representatives, at which the cause of pharmacy was presented with consummate skill. Conditions as they actually exist were portrayed to the committee, and the glaring defects in the present system were pointed out. While no definite action was taken by the committee, it was apparent that our case had been presented with great force and in a convincing manner.

The following summer there was a change in the Medical Department of the Army. Surgeon General Patterson having succeeded Surgeon General Ireland. This change necessarily set back our program as it was essential that Surgeon General Patterson be made familiar with our objectives, the reasons upon which they rested and the progress which had been made. At this point, I desire to record the very definite impression that the members of this committee feel that Surgeon General Patterson soon became alive to the importance of the position taken by the AMERICAN PHARMACEUTICAL ASSOCIATION and he pledged his best efforts to bring about the necessary changes as soon as possible. At this time, Surgeon General Patterson was interested in legislation to provide a general reorganization of the medical service of the army, which would provide an increase in professional personnel, in addition to a more unified and better classified unit. In pursuance of his official plan the Surgeon General announced disapproval of a separate pharmacy corps, and expressed his preference that pharmacy be placed in the Medical Administration Corps in which the various medical specialties would be grouped. Surgeon General Patterson also expressed his disapproval of separate action by pharmacy to attain a distinct pharmacy corps. He referred to this as piecemeal legislation, and said that he would regard it as inimical to his general plan for an improved medical service. In the conference with him and his advisers, immediately before the meeting of this ASSOCIATION at Toronto last year, Surgeon General Patterson reiterated his promise to aid in securing proper legislation as soon as possible, and on this occasion he again expressed his approval of the ASSOCIATION'S activities in behalf of an adequate pharmaceutical service in the army and asked that his office be informed as to our plans, and that the ASSOCIATION continue to maintain contacts with him until a satisfactory outcome could be brought about.

A few weeks ago a conference was had with Surgeon General Patterson and his advisers. This meeting was attended by Dr. E. F. Kelly, Dr. Samuel L. Hilton and Robert L. Swain. The whole situation was surveyed and brought up-to-date. The Surgeon General reaffirmed his previously expressed views, and again expressed approval of our activities.

It is deeply regretted by this committee that our objective is still so indefinite so far as realization is concerned. However in view of the financial crisis which has faced the Federal Government, and in view also of the reduction made in the personnel of the various departments of the Government including the Medical Department of the Army this committee has not seen fit to take any aggressive stand during the past year. This position seemed the only sound one in face of the peculiar conditions existing but was not finally decided upon until prominent members of both houses of Congress had expressed the belief that our cause would be put in a false light, and perhaps greatly injured if any plan was adopted which might be misunderstood as unfriendly to the Administration's retrenchment program. For these reasons the committee has largely marked time during the past year, and has deferred to those considerations which seemed to point out the dangers of any other course.

In conclusion the retiring committee strongly recommends that the AMERICAN PHARMACEUTICAL ASSOCIATION continue a Committee on Pharmacy Corps in the United States Army that the committee be instructed to continue its contacts with the Surgeon General, and that it be authorized to adopt such other plans as will best serve to bring about an adequate and thoroughly satisfactory pharmaceutical service in the United States Army.

ROBERT L. SWAIN, *Chairman*

Secretary Kelly hoped that interest would not be lost in this important movement, because of present conditions. He stated that commissions for pharmacists in Public Health Service had worked out very satisfactorily and that it was equally important to have pharmacists commissioned in the Army.

Chairman Slocum thanked Dr. Swain, the report was accepted.



The report on the U S Pharmacopoeia was called for. There was no report at this time. Secretary Kelly reported progress for the Committee on the Study of Pharmacy. "The Council on Pharmaceutical Education has been organized and is functioning," he said. This body made a report to the Council, it is taking over part of the work which the Committee on the Study of Pharmacy was to cover.

Chairman Hugo H. Schaefer presented the report of the Committee on Tolerances. President Philip spoke of the importance of this work. The report was accepted. It follows.

#### REPORT OF THE COMMITTEE ON TOLERANCES

Your Committee on Tolerances consisting of Messrs. Hilton, Swain and myself soon after its appointment last November found that the problem confronting them was a huge one. Each of the great number of operations involved in compounding prescriptions requires a separate study in order to determine what constitutes a reasonable tolerance. The chief factors to be studied are

- (a) Moisture and allowable impurities in chemicals
- (b) Decomposition and deterioration
- (c) Unavoidable errors in the weight of individual powders, pills or capsules
- (d) Unavoidable losses due to a portion of the prescription ingredients remaining in the mortar or adhering to utensils
- (e) Unavoidable errors in weighing and measuring

The third of these problems is the one with which your Committee has been most active. The Boards of Pharmacy of a number of States have agreed to include certain suggested simple powder prescriptions in their practical examinations and to forward the finished products to members of our Committee who will check the weights and determine the differences in weights of the individual powders. The same prescription will also be compounded in a large number of pharmacies throughout the country and checked by our Committee.

At the suggestion of Dr. E. N. Gathercoal, Chairman of the N. F. Committee, Drs. Swain, Kelly, Krantz and Briggs have been appointed as a Sub Committee to develop tolerances for certain capsules which may be included in the new N. F. and at the same time consider tolerances for capsules compounded in regular prescription work. The data obtained along these lines is not, however, considered sufficiently extensive as yet for publication or for warranting definite recommendations. Your Chairman is also tabulating the results of the analyses of thousands of prescriptions collected by Board of Pharmacy Inspectors and analyzed by him.

On May 1, 1933 your Committee had a conference in Washington with Dr. W. G. Campbell, Chief of the Bureau of Food and Drug Administration, U. S. Department of Agriculture. Dr. Campbell showed great interest in the work and objects of our Committee and offered his full cooperation.

During May a news Bulletin was prepared by our Committee on the general subject of Prescription Tolerances and copies were sent by Secretary Kelly to pharmaceutical publications, to the presidents and secretaries of State Pharmaceutical Associations and to the secretaries of Boards of Pharmacy. A number of replies were received showing a considerable interest in the subject.

As stated earlier in this report the subject is a huge one and the surface has only been scratched. A wide sphere of cooperation must be sought and obtained in order to collect the material for study.

S. L. HILTON,  
ROBERT L. SWAIN,  
HUGO H. SCHAEFER, *Chairman*

The report of the Chairman of the Pharmaceutical Syllabus, owing to the absence of Chairman J. G. Beard, was read by H. M. Burlage. After discussion the report was received and referred to the American Council on Pharmaceutical Education. It will be printed under "Committee Reports" in a later issue of the JOURNAL.

The report of the Committee on William Procter, Jr. Memorial Fund was read by Secretary Kelly, who gave a brief history of the Fund and the recent considerations. The statue will be placed in Memorial Hall of the Headquarters Building. It is not planned to have any other statues or pictures in the Hall at present. The report was accepted, it follows.

## REPORT OF COMMITTEE ON THE WILLIAM PROCTER, JR MEMORIAL FUND

The Committee on the William Procter, Jr Memorial Fund is pleased to report that its chairman had a recent interview with the architect of the AMERICAN PHARMACEUTICAL ASSOCIATION Headquarters Building in Washington, at which the site for the proposed memorial was agreed upon. Because of the present background and perspective, some changes must be made in the model that had been previously approved by the Committee, and the sculptor has been requested to submit another model, subject to the approval of this committee and the architect.

The necessary details are now being assembled for the erection of a life size bronze figure of The Father of American Pharmacy, on a four-foot marble pedestal which will comport with the tones of the entrance hall to the Headquarters Building.

This Committee appreciates the indulgence of the AMERICAN PHARMACEUTICAL ASSOCIATION in the unavoidable delays to complete its work and we are confident that the present proposition will be more satisfactory to our membership than was the original plan to place the detached monument in another section of Washington.

Respectfully submitted,  
JAMES E HANCOCK, *Chairman*

## COMMITTEE ON INTERNATIONAL PHARMACEUTICAL NOMENCLATURE

Chairman A G DuMez reported progress in the unification of international pharmaceutical nomenclature. He stated that each Pharmacopœia as it appears shows a decided step toward a uniform system of nomenclature. He referred to the nomenclature of the last edition of the Danish Pharmacopœia which corresponds very closely to that of the U S P. At the Brussels Conference held in 1925, the United States and Great Britain had a great deal to do with the adoption of principles governing nomenclature and this he thought influenced the nomenclature in the revision of the various pharmacopœias.

Chairman Slocum stated that if there was no objection the report would be received, it was so ordered.

The report of the Committee on Cooperative Publicity was called for. Secretary Kelly responded by saying that the activities of the Bureau had been temporarily discontinued. It is kept on the roll to become active when this work is again taken up. He, therefore, reported progress for the Committee.

The report of the Committee on Prerequisite Legislation was called for. In the absence of Chairman Jordan, Secretary Kelly reported that the Committee was cooperating whenever possible. The number of states now having prerequisite legislation is about forty and it is hoped that in the next few years all states will have adopted prerequisite legislation. He referred to Georgia as one of the states that recently has provided a full prerequisite law. The report was accepted and made a record.

Secretary Kelly presented the report of Chairman F E Stewart, of the Committee on Patents and Trade Marks. He referred to the work of Dr Stewart over a period of many years and moved that the report be received for publication.

E G Eberle seconded the motion and asked to be permitted to include an expression of thanks for the long service that Dr Stewart has rendered in this capacity. The Secretary desired to include this in his motion, but had left this to Mr Eberle, because of his long acquaintanceship with Dr Stewart, the report was accepted, and a vote of thanks was tendered to Dr Stewart. (The report will be printed under 'Committee Reports' in this or a later issue of the JOURNAL.)

The report of the Committee on Local Branches was presented and read by the Chairman, C Leonard O'Connell. It was received and accepted. The report follows.

## REPORT OF COMMITTEE ON LOCAL BRANCHES

In spite of the unfavorable economic situation, the various local branches throughout the country functioned unflinchingly. The programs were varied and exhibited in the main the ideal upon which the ASSOCIATION was founded, that is that in the proceedings of the ASSOCIATION there is a place for every legitimate activity of pharmacy.

The Committee would strongly urge the establishment of a local branch wherever conditions warrant and this Committee and Secretary Kelly will aid in the establishment of them in every possible way.

The report of the Committee on Membership was called for.

## REPORT OF THE COMMITTEE ON MEMBERSHIP

Secretary Kelly stated that the Committee felt that during this year it would be unwise and probably unprofitable to undertake very aggressive work by the Committee on Membership. In his report as Secretary he had given the status of membership at the present time which, although not as satisfactory as might be wished for, he felt that the Association had reason to be thankful for the showing.

President Philip stated that he had hoped for an increase in membership, but that after due consideration it was not deemed advisable to make a special effort to secure membership, as this might interfere with state association membership and the A. P. H. A. seeks in every possible way to work with state associations. He thought that the time was coming when the plan of the American Medical Association would be made effective having a membership which would apply to local and state associations and the national bodies.

Chairman Sloeum stated that he had sent out letters to state association presidents and secretaries asking their support in increasing the membership of the A. P. H. A. In his opinion all presidents and secretaries of state associations should be members of the A. P. H. A., and, in carrying out his view, he had brought the President of the Iowa Association with him. He hoped that the secretaries would give more attention to the securing of members in their respective states.

Secretary Kelly stated that President Fleet Swain has aggressive plans which he hopes to make effective during his year of office.

Chairman Sloeum stated that it was necessary for Mr. Hankins, who was named Chairman of the Committee on Resolutions to return home and Dr. Fischelis had kindly consented to act as Chairman of that Committee and, because of the change the Committee was not prepared to report at this session.

Dr. James C. Munch reported for the Committee on Physiological Testing and elaborated on the report which follows.

## REPORT OF COMMITTEE ON PHARMACOLOGY AND BIOASSAYS

The bioassay of two samples of Tincture of Digitalis "A" and "B" by the U. S. P. X one-hour frog method was continued during last year. At the time of manufacture a portion of Tincture "A" was diluted with sufficient 70 per cent alcohol to make it 70 per cent of the original potency and labeled Tincture "B". These tinctures were bottled in amber, blue and colorless flint one-ounce bottles and in amber four ounce bottles and stored at room temperature. Reassays have been made from time to time to determine the change in potency.

It was hoped that the assays made in February 1933 when these tinctures were four years old, might suffice to close this investigation. However, the results obtained during this year suggest the advisability of continuing this investigation for one year further, and making assays during the month of February 1934 by all collaborators. It is desired that assays be made by the one hour frog method also by the four hour frog method and certain other methods to which the collaborators are accustomed.

Clinical investigations of these tinctures are being continued and will be reported next year.

General progress has been made in the collection of information and photographs, to serve as the basis of compilation of a "Who's Who in Bioassays."

Individual members of this committee have assisted in cooperative investigations relating to U. S. P. and N. F. revisions.

(Signed) E. E. SWANSON,  
L. W. ROWE,  
JAMES C. MUNCH, *Chairman*

Chairman Munch commented on the report and explained the work which had been carried on during the year. He stated Dr. Wolf, professor of Cardiology in Temple University, had become interested and was making tests of this material on his patients, that is, on those requiring digitalis clinically.

The Chairman restated that these materials at the time they were prepared were placed in 1 ounce bottles and 4-ounce bottles. The bottles used each time for testing had not been previously opened. If these bottles had been previously opened, it is quite possible the deteriora-

tion would have been greater than observed (The loss in potency after 4 years, of Tincture A, was about 20 per cent, Tincture B is now about 80 per cent—about the same proportional activity as with the freshly prepared material)

He stated further that another report was in progress, namely that we should have a 'Who's Who in Bioassays' The Committee has been in touch with various men in this field throughout the world asking them for autographed photographs, a list of their publications and titles in order that these can be arranged in book form He said further that if there is demand for this work it can be printed in the JOURNAL that the Committee will have something that can be placed on file in the American Institute of Pharmacy, as a more-or-less permanent memorial of 'Who's Who in Bioassays' The Committee expected to work along the same lines during the coming year

E V Lynn moved that the report be received

H V Army asked whether consideration had been given to the effect of light in the keeping qualities of digitalis preparations

Chairman Munch replied that the bulk of the material was stored in a dark room that thirty gallons of the original was still unopened in five-gallon bottles and is being kept at room temperature in wood boxes It is hoped to assay these samples this year There seems to be no consistent difference in deterioration on account of the glass

H V Army said that in his opinion too many of the previous papers had been based on preparations under abnormal conditions A motion to receive the report was seconded and carried

Dr C Leonard O'Connell introduced Mr Lee of the Student Branch of the University of Pittsburgh

Chairman Slocum asked for further reports

Secretary Kelly stated that a number of the sections had reported on the transactions and these were accepted They are printed on page 1056—Final Session

He said that he was one of three delegates for the National Drug Trade Conference, but Dr Hilton and he were of the opinion that no report was necessary at this time

The following reports were presented and accepted on Horticultural Nomenclature, and on Weights and Measures, they follow

#### REPORT OF THE COMMITTEE ON HORTICULTURAL NOMENCLATURE

During the past year we have not been called upon by the Committee on Revision of Standardized Plant Names for additional assistance in the revision of the second edition of that work Your Chairman has been in communication with Prof Kelsey, Secretary of the American Joint Committee in regard to the present status of the revision Under date of June 13th, Secretary Kelsey sent your Chairman the following reply

It had been hoped to get 'Standardized Plant Names' new edition, out by 1933 but I doubt if it will be ready before 1934 or possibly 1935 A great amount of work has been done particularly on certain lists of forage and grazing plants of the West As you perhaps know 'Standardized Plant Names' has been adopted by the United States Government Printer and is coming into more and more universal use all the time I believe the time has come for us to adopt the international code as a basis of our botanical names but of course this would make very little difference in the make-up as perhaps only 50 or 100 names could come under consideration and be different from what we already have maybe not as many as this You may be interested in knowing that it now seems probable that there will be nearly 15 000 or 20 000 additions to the name list in the new edition Probably in the fall we will have a meeting of the general committee and outline how it is to be finally done"

In an earlier letter Secretary Kelsey stated that as soon as the galley proofs came from the press this committee would be asked to critically read them and make suggestions We are thus assured of an opportunity to extend the usefulness of the coming edition to the drug industry

(Signed) C W BALLARD,  
E N GATHERCOAL,  
H W YOUNGKEN *Chairman*

## REPORT OF COMMITTEE ON WEIGHTS AND MEASURES

Very little activity of a National character, concerning the Metric System, has taken place during the last year

The Metric Association approved the following joint Resolution at their meeting held in Atlantic City, December 29, 1932

WHEREAS the United States yard is about ten per cent shorter than the International meter (or metric yard), and

WHEREAS the United States liquid quart is about five per cent less than the International liter (or metric quart), and

WHEREAS the United States avoirdupois pound is about ten per cent less than five hundred grams (or the metric pound), and

WHEREAS the International meter, liter and gram have been legalized by Congress in 1866 for use in the United States

*Therefore, be it resolved and enacted* by the Senate and House of Representatives of the United States of America in Congress assembled that on and after the first day of January 1934, the term 'Metric Yard' be recognized as identical with and usable as a substitute for the International meter by all Departments of the United States Government the metric quart for the International liter and the metric pound for five hundred grams

The committee decided not to present these resolutions to the House of Representatives due to political adjustments, that were taking place in Washington, also due to the economic stress and much legislation which the Government had to deal with at the time

At the coming annual meeting in Cambridge, the committee plans to present new resolutions for approval then to an early session of the House of Representatives

We, as pharmacists, are in one way, in a better position to carry on an individual educational program through our teaching of the system in our Colleges of Pharmacy, thus presenting its advantages to thousands who would otherwise have no knowledge of, or practice with it. If it could be presented to the medical students as thoroughly as it is to the pharmacy students and its advantages realized by them it would be a step toward more general use by the physician

LEON A. THOMPSON, *Chairman*

(Other reports will be printed with these minutes or under Committee Reports in a succeeding issue of the JOURNAL. The large number of reports and the extent of the minutes make it necessary to defer some of these reports to a succeeding issue.)

Chairman Fischelis stated that a meeting of the Committee on Resolutions would be held immediately after the conclusion of this session of the House of Delegates

Secretary Kelly called attention to the interest of the A. P. H. A. in State associations. He stated that State associations can benefit by the work of this organization. Incidentally he referred to the roster of the ASSOCIATION, which had been helpful to State officers, and should be kept up to-date

Mrs. Philip referred to the time of meeting of State associations and the meeting of the A. P. H. A. at a later date

Chairman Slocum called the attention of the delegates to the fact that the reports of the various committees of the ASSOCIATION had been submitted to the House not only to secure action upon them but also to inform the delegates of the wide range of work for pharmacy carried on by the ASSOCIATION. Some of these might appear of little direct advantage to practicing pharmacists at this time, they were fundamental in character and the helpful results would become apparent

Chairman Slocum stated that the Final Session of the House of Delegates would be held at 7:30 P. M. and he asked for promptness as the General Session of the ASSOCIATION would convene at 8:30 P. M.—the report of the Committee on Resolutions would be presented at the Final Session

On motion duly seconded the Third Session of the House of Delegates was adjourned

## FINAL SESSION

The Fourth Session of the House of Delegates was convened at 7 40 P M, by Chairman Slocum

The minutes of the Third Session of the House of Delegates were read and approved

The following reports were read and approved The Conference of Pharmaceutical Association Secretaries, by Charles J Clayton, Conference of Law Enforcement Officials, by M N Ford, Section on Commercial Interests, by Russell B Rothrock, Scientific Section by L W Rowe, Section on Practical Pharmacy and Dispensing, by I A Becker, Section on Historical Pharmacy, by C O Lee The reports follow

*Conference of Pharmaceutical Association Secretaries* The reports of President J L Hayman and Secretary-Treasurer Carl G A Harring were adopted

Motions to contribute \$50 00 to the Pharmacy Exhibit at the Century of Progress and \$100 00 to the Pharmacy Building in Washington, before January 1, 1934, were adopted

Motions to arrange for a dinner in time for next year's program, and to arrange for a joint session with the Section on Education and Legislation and Law Enforcement Officials were adopted

All topics of the program were discussed, also, Resolutions asking Executive State Committees to instruct secretaries to prepare resolutions on topical questions, and resolution of thanks to outgoing officers

The following officers were elected *President*, R C Wilson, Georgia, *First Vice President* F V McCullough, Indiana, *Second Vice-President*, R Weaver, Oklahoma *Executive Committee* J L Hayman, West Virginia, J J Gill, Rhode Island, Roy C Reese, Kansas, W E Bingham, Alabama, *Delegate to the House of Delegates*, William B Day, Illinois

*Conference of Law Enforcement Officials* The conference held two very interesting sessions as well as a joint session with the Section on Education and Legislation and the Pharmaceutical Association Secretaries

The program was carried out as arranged A committee was appointed to study ways and means of providing more adequately for the protection of the public in safeguarding all functions that have to do with prescription service from the time a prescription is written for a patient to the ultimate delivery of the finished medicine, so as to assure a continuity of adequate supervision in this important health function

A committee was appointed to draft a suitable definition for Patent and for Proprietary Medicines

The following officers were elected *Chairman*, R L Swain, Maryland, *Secretary and Treasurer*, M N Ford, Ohio, *Delegate to the House of Delegates*, Fred Schaefer, New York

*Section on Commercial Interests*—The Section held two sessions, many interesting papers were read and discussed The following officers were elected *Chairman*, John A J Funk, Indiana, *Vice-Chairman* Henry Brown, Pennsylvania, *Secretary*, W J Rodman, New Jersey, *Delegate to the House of Delegates*, R B Rothrock, Indiana

*Scientific Section*—An extra session, granted by the Council, was very helpful In the three sessions and the joint session with the *Section on Practical Pharmacy and Dispensing*, 53 papers were presented and about 40 papers were read by title

The following officers were elected *Chairman*, F E Bibbins, Indiana, *First Vice Chairman*, E V Lynn, Washington, *Second Vice-Chairman*, H M Burlage, North Carolina, *Delegate to the House of Delegates*, W J Husa Florida

*Section on Practical Pharmacy and Dispensing*—The Section on Practical Pharmacy and Dispensing held two sessions. In the absence of Chairman W Paul Briggs, Vice Chairman Marvin J Andrews presided Fifteen papers were read by the authors, and nineteen were read by title The papers evoked a lively discussion in many instances

The following officers were elected *Chairman*, Marvin J Andrews, Maryland, *Vice Chairman*, R W Clark, Wisconsin, *Secretary*, R E Terry, Illinois, *Delegate to the House of Delegates*, L W Rising New Jersey

*Section on Historical Pharmacy*—Two sessions of the Section were held Thirty two titles for papers, in all, were submitted for this Section, many of which were accompanied by pictures and illustrations A few were illustrated and presented with slides

The material which has been presented is biographical, and historical, with respect to institutions, organizations, practices, apparatus, drugs and preparations

A total of 25 papers were read, either in full, in part, or by title, including the report of Historian E G Eberle and the address of Chairman Louis Gershenfeld The latter address contained several resolutions which have been considered in the usual way

Much interest was displayed in the papers and comments upon them

Upon motion of Historian Eberle, the Section directed that Secretary Kelly communicate the proper expressions of sympathy to the family of Professor H G Greenish and a similar letter to the British Pharmaceutical Society

President Philip expressed appreciation of the work of the Section in a few words, at the Second Session

The following officers were elected *Chairman*, Louis Gershenfeld, Pennsylvania, *Secretary*, C O Lee, Indiana, *Historian* Eugene G Eberle, Maryland, *Delegate to House of Delegates*, J T Lloyd, Ohio

Chairman R P Fischelis presented the report of the Committee on Resolutions These resolutions were separately presented and discussed and on motion duly seconded were adopted The resolutions were then adopted as a whole and as adopted are printed in the JOURNAL for September, on pages 879-882

Chairman Slocum stated that the final order of business was the installation of officers He congratulated the Chairman Elect, P H Costello, of North Dakota, and installed him He replied that he esteemed the honor and spoke for the helpfulness of the ASSOCIATION for North Dakota pharmacists and expressed their appreciation

Vice President S A Williams was absent and his colleague, W E Bingham, spoke for him, the latter acting as proxy

There being no further business, the Final Session of the House of Delegates was then regularly and in due form adjourned

## PHYSICIANS AND THE NRA

A letter from Gen T S Hammond, Executive Director, Blue Eagle Division of the National Recovery Administration, to the American Medical Association expresses his regret that recent editorials in the *Journal* have indicated 'a misunderstanding of the National Recovery Administration's policy toward doctors and dentists' The headquarters personnel of the American Medical Association has studied the National Industrial Recovery Act ever since it was introduced in Congress It has also studied the President's Reemployment Agreement The act is, by its terms, clearly limited to trades and industries It is not applicable to the professions, except as they are integral parts of trades and industries, and the private practice of medicine does not come within that category If Congress had intended the act to cover the professions, it easily could and presumably would have said so—From an editorial in the *Journal A M A*

Miss Esther Barney is constantly in charge of the Pharmacy Exhibit at the Century of Progress She is alert, makes visitors welcome

and sees that pharmacists register Others, in charge of divisions of the exhibits know her because of her activity for pharmacy and because of her ability to look after visitors, she is conversant in several languages It requires constant watchfulness to keep the exhibits intact In his remarks, Chairman Christensen, before the General Session referred to her ability in the discharge of her duties

Prof Otto Raubenheimer spoke on the history of pharmacy at the fifth annual exhibition of the St Johns University College of Pharmacy, held annually in conjunction with the observance of National Pharmacy Week Prof Herbert Raubenheimer was in charge of the program

An editorial of the *Pennsylvania Pharmacist* states that "every pharmacist should subscribe to and read the JOURNAL A PH A, it is as important to the pharmacist as the *Journal A M A* is to the physician"

Dr Thomas Hunt Morgan, Pasadena, Calif, former president of the National Academy of Sciences and of the American Association for the Advancement of Science, has been awarded the Nobel Prize for 1933

## ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL  
ASSOCIATION 1933-1934

Office of the Secretary 10 West Chase St , Baltimore, Md

October, 3 1933

### LETTER NO 2

*To the Members of the Council*

For the benefit of new members of the Council it is pointed out that motions made by mail in the interim between meetings of the Council require no second

*(Motion No 1) It is moved by Eberle that the minutes of the first meeting of the Council, 1933-1934, as presented in Council Letter No 1, be approved*

17 *Use of Text of N F V* The following communication has been received from Chairman DuMez of the Committee on Publications

"I have looked into the request of the J B Lippincott Company for permission to use portions of the N F text in the preparation of a textbook on Materia Medica by Dr Charles Solomon, of Brooklyn, N Y , and see no good reason why permission should not be granted

'It appears from the portion of the manuscript submitted that the only use which will be made of the N F text is the quotation of titles and dosage This should help to popularize the National Formulary among nurses for whom the textbook is intended It is, therefore, recommended to the Council that permission be granted the J B Lippincott Company to use portions of the text of the National Formulary V in the preparation of a textbook on Materia Medica written by Dr Charles Solomon, of Brooklyn, N Y , and that a nominal fee of \$5 00 be charged for this grant "

*(Motion No 2) It is moved by DuMez that the J B Lippincott Company be given permission to use portions of the text of the National Formulary V in the preparation of a textbook written by Dr Charles Solomon on Materia Medica, and at the usual charge of \$5*

18 *Applicants for Membership* The following applications properly endorsed and accompanied by the first year's dues have been received

No 1, Barbara J Barry, 1919 Vallejo St , San Francisco, Calif , No 2, N N Brakke McVile, N Dak , No 3 Roy L Crouch, R F D No 2, Roanoke, Va , No 4, Charlotte I DuBois, 37 Cathedral Ave , Garden City, N Y , No 5, Jeanette B Osofsky, 54 Pershing Ave , Elizabeth, N J , No 6, Benjamin S Paschalt, 1014 Am Bank Bldg , Seattle, Wash , No 7, Frank C Smolensky, 49 Durant Ave , Clifton N J , No 8 Albert F Veeder, State Hospital, Rochester, N Y , No 9, Herman S Waller, 32 W Randolph St , Chicago, Ill

*(Motion No 3) Vote on applications for membership in the American Pharmaceutical Association*

E F KELLY, Secretary

October 3, 1933

### LETTER NO 3

*To the Members of the Council*

19 *Transfer of Property between the U S A and the Association as provided under Public Resolution No 18, and the Agreement for the Occupancy of U S Reservation No 332 B* It will be recalled that when the ASSOCIATION decided to locate the Headquarters Building in Washington, three lots, Nos 3, 4 and 5, in Square 62, as shown on the plat attached, were purchased as a site and plans were made to erect the building thereon The Commission of Fine Arts suggested, in order to provide a more suitable setting, that if the ASSOCIATION would purchase Lots 12, 13, 14, 15 on the west, and Lots 16, 17, 800 801 and 802 on the east, so as to own the entire frontage, the Government would be requested to close Upper Water Street in this square in order that the Building could be located in proper relation to the plans for Constitution Avenue



and to give the ASSOCIATION the use of the Reservation between Water Street and Constitution Avenue as had been done for the National Academy of Science in the adjoining square. The ASSOCIATION purchased the property referred to, with the exception of Lot 18, which is still in negotiation, and had to purchase Lot 7 to obtain the others. In May 1932, Public Resolution No. 18 was passed by Congress and signed by the President to complete the arrangement. Public Resolution No. 18, copy attached, was quoted in full on page 721 of the July 1932 issue of the JOURNAL. It provided for (1) the closing of Upper Water Street between 22nd and 23rd Streets and the transfer of this property to the Director of Public Buildings and Public Parks, (2) the transfer to the ASSOCIATION by the U S A through the Director of Public Buildings and Public Parks, of such an area, adjacent to its property as shall be agreed upon by the ASSOCIATION and the two Commissions named, to provide a proper setting for the Building, (3) the transfer to the U S A by the ASSOCIATION of a strip of its property 17 feet in depth along 23rd Street for the widening of that street as an approach to the Lincoln Memorial. In the old section of Washington including Square 62, the beds of streets were dedicated and can be closed only by an act of Congress when title to the area closed reverts to the United States.

In the meantime it was agreed that the Building should be moved forward to conform with the general plans and be partly located on the bed of Water Street. After careful consideration it was agreed between the Commissions and the ASSOCIATION that the equivalent of the bed of Water Street should be transferred to the ASSOCIATION in order to protect its Building and that the ASSOCIATION should be granted the occupancy of U S Reservation No. 332 B on the same terms and conditions as the Academy of Sciences had been granted the occupancy of U S Reservation No. 332 A. It was also agreed that in the transfer the southern line of the bed of Water Street should be made parallel to Constitution Avenue.

It has not been possible to ask the Council for definite action on these transfers and occupancy earlier, as the necessary surveys had not been completed, and the deeds and agreements drawn.

Below are quoted in order named

#### THE DEED FROM THE U S A TO THE ASSOCIATION

##### THIS DEED

MADE this — day of October in the year ONE THOUSAND NINE HUNDRED AND THIRTY-THREE, by and between the United States of America acting in this behalf by ARNO B. CAMMERER, Director of the Office of National Parks, Buildings and Reservations in the Department of the Interior (successor to the Director of Public Buildings and Public Parks of the National Capital in accordance with Public No. 2, approved March 20, 1933, and Executive Order June 10, 1933), acting herein in pursuance of Public Resolution No. 18, 72nd Congress of the United States of America, approved May 13, 1932, and approved by the Secretary of the Interior, party of the first part, and AMERICAN PHARMACEUTICAL ASSOCIATION, a body corporate duly incorporated under the laws of the District of Columbia, party of the second part.

WITNESSETH, That in consideration of the transfer to the United States of America of title to a strip of ground seventeen (17) feet in depth along 23rd Street, parts of original Lots 7, 12, 13, 14 and 15 in Square 62, by the AMERICAN PHARMACEUTICAL ASSOCIATION and other considerations which are a great benefit to the orderly development of the National Capital, the said party of the first part does hereby grant unto the said party of the second part all of the title of the UNITED STATES OF AMERICA in and to the following described land and premises situate in the District of Columbia:

Part of Upper Water Street closed, and part of U S Reservation No. 332 B, all described as one parcel as follows:

Beginning for the same at a point in the southerly line of Lot 12, Square 62, distant 17.57 feet easterly from the southwest corner of said Lot 12, and running thence with the northerly line of Upper Water Street closed easterly 266.11 feet to the west line of 22nd Street, thence with said west line, south 49.01 feet thence leaving said 22nd Street and running west 257.430 feet, thence north and parallel to 23rd Street, 116.39 feet to the point of beginning, containing 21,288.80 square feet, all as shown on plat of computation in Survey Book 103, page 16, Surveyor's Office, D. C.

And the grantee herein agrees for itself, its successors and assigns to the provisions contained in the aforesaid Public Resolution No 18, 72nd Congress, that (1) the Commissioners of the District of Columbia shall be allowed and permitted to enter upon any part of the herein described land at all times for the purpose of maintaining and/or repairing all existing sewers and sewer appurtenances, and (2) that the use of any building or buildings erected or caused to be erected on any land within Square 62 or the herein described land shall be limited to organizations and institutions serving American pharmacy on a nonprofit basis,

And the grantee herein further covenants and agrees for itself, its successors and assigns that no building or structure other than that now erected by the grantee on land within Square 62 or on the land described herein shall ever be erected or caused to be erected nor shall any additions, alterations or changes be made or caused to be made to said building now erected by the grantee on any land within Square 62 or the herein described land, without first obtaining the approval thereto in writing of the National Capital Park and Planning Commission and the National Commission of Fine Arts, or their successors, acting for and on behalf of the United States of America

The covenants and conditions contained herein are to be taken as running with the land conveyed and described herein and form a part of the consideration for the conveyance herein

And the said parties of the first part covenant that they will execute such further assurances of said title of the United States of America as may be requisite

WITNESS his hand and seal the day and year hereinbefore written

APPROVED

\_\_\_\_\_  
(SEAL)  
Director of the Office of National  
Parks, Buildings and Reservations in  
the Department of the Interior

\_\_\_\_\_  
Secretary of the Interior  
In the presence of

DISTRICT OF COLUMBIA To wit

I, \_\_\_\_\_, a Notary Public in and for the said District of Columbia, do hereby certify that ARNO B CAMMERER, Director of the Office of National Parks, Buildings and Reservations in the Department of the Interior party to a certain Deed bearing date on the \_\_\_\_ day of October, A D 1933 and hereto annexed, personally appeared before me in the said District of Columbia, the said ARNO B CAMMERER, being personally well known to me as the person who executed the said Deed and acknowledged the same to be his act and deed

GIVEN under my hand and official seal, this \_\_\_\_ day of \_\_\_\_\_ A D 1933

\_\_\_\_\_  
Notary Public

THE DEED FROM THE ASSOCIATION TO THE U S A

#### THIS DEED

MADE this \_\_\_\_ day of SEPTEMBER, in the year one thousand nine hundred and thirty three, by and between AMERICAN PHARMACEUTICAL ASSOCIATION, a body corporate duly incorporated under the laws of the District of Columbia, acting herein pursuant to a resolution of its Council (a copy of which resolution is attached hereto and made a part hereof), party hereto of the first part, and UNITED STATES OF AMERICA, party of the second part

WITNESSETH, that the said party of the first part, for and in consideration of ONE DOLLAR AND OTHER CONSIDERATIONS, does hereby grant unto the party of the second part, in fee simple, the following described land and premises, with the improvements, easements and appurtenances thereunto belonging situate and being in the County of Washington, in the District of Columbia, namely

Part of Original Lot Seven (7) in Square Sixty-two (62), and parts of Lots Twelve (12), Thirteen (13), Fourteen (14) and Fifteen (15) in Square Sixty-two (62), as shown on plat recorded in Liber Eighteen (18), folio Fifty six (56) in the Office of the Surveyor for the District of Columbia, all described in one parcel as follows

Beginning for the same in the east line of 23rd Street at the southwest corner of Lot Twelve (12) in Square Sixty two (62) and running thence with the east line of 23rd Street, north One hundred and twenty and seventeen one hundredths (120 17) feet to the northwest corner of Original Lot Seven (7) in Square Sixty-two (62), thence with the north line of said Lot Seven (7), east seventeen (17) feet, thence parallel to the east line of 23rd Street, south One hundred and twenty-four and sixty two one hundredths (124 62) feet to the southerly line of Lot Twelve (12) in Square Sixty two (62), thence with said southerly line, northwesterly Seventeen and fifty seven one hundredths (17 57) feet to the point of beginning containing Two thousand and eighty and seventy two one hundredths (2080 72) square feet, all as shown on plat of computation by the Surveyor of the District of Columbia filed in Survey Book 103, at page 16 in that office

AND the said party of the first part covenants that it will warrant generally the property hereby conveyed and that it will execute such further assurances of said land as may be requisite

IN TESTIMONY WHEREOF, on the day and year first hereinabove written, the said AMERICAN PHARMACEUTICAL ASSOCIATION has caused these presents to be signed with its Corporate name by \_\_\_\_\_, its President and by \_\_\_\_\_, its Secretary, attested by \_\_\_\_\_, its \_\_\_\_\_, and its Corporate Seal to be hereunto affixed, and does hereby constitute and appoint \_\_\_\_\_, its President, and \_\_\_\_\_, its Secretary, its true and lawful Attorneys in Fact for it and in its name to appear before any officer authorized by law to take and certify acknowledgments of conveyances of land in the District of Columbia, and then and there to acknowledge and deliver these presents as its act and deed

AMERICAN PHARMACEUTICAL ASSOCIATION  
By \_\_\_\_\_

\_\_\_\_\_  
President

\_\_\_\_\_  
Secretary

Attest \_\_\_\_\_

( )

I hereby certify that the foregoing Deed was executed and delivered pursuant to and in strict conformity with the provisions of a Resolution of the Council of AMERICAN PHARMACEUTICAL ASSOCIATION (a copy of which resolution is attached hereto and made a part hereof) passed at a regular meeting held on the \_\_\_\_\_ day of \_\_\_\_\_, 1933

\_\_\_\_\_  
Secretary

DISTRICT OF COLUMBIA, To wit

I, \_\_\_\_\_, a Notary Public in and for the District of Columbia, do hereby certify that \_\_\_\_\_ and \_\_\_\_\_, who are personally well known to me to be the persons named as Attorneys in Fact in the foregoing and annexed Deed dated the \_\_\_\_\_ day of SEPTEMBER, A D 1933 to acknowledge the same, personally appeared before me in the District of Columbia aforesaid, and as Attorneys in Fact as aforesaid, and by virtue of the power and authority in them vested by the aforesaid Deed, acknowledged the same to be the act and deed of AMERICAN PHARMACEUTICAL ASSOCIATION, the Corporation grantor therein and delivered the same as such

GIVEN under my hand and official seal this \_\_\_\_\_ day of September, A D 1933

\_\_\_\_\_  
Notary Public

THE AGREEMENT FOR THE OCCUPANCY OF THE U S RESERVATION NO 332 B, AND FOR COMPARISON AND RECORD

PERMIT TO AMERICAN PHARMACEUTICAL ASSOCIATION

WHEREAS, by Section 2 of an Act of Congress approved July 1, 1898 (30 Stats, page 570), as amended by Act approved April 14, 1906 (34 Stats Part 1, pages 112, 113), Public No 2 approved March 20, 1933, and Executive Order June 10, 1933, the Director of National Parks, Buildings and Reservations is authorized temporarily to turn over the care of certain parking

spaces in the District of Columbia to private owners of adjoining lands under such regulations as he may prescribe, and with the condition that the said private owners shall pay special assessments for improvements contiguous to such parking, under the same regulations as are or may be prescribed for private lands,

NOW THEREFORE, This is to certify that the care of the United States parking space known as Reservation No 332 B adjoining the south side of Square 62, and located between 22nd and 23rd Streets and Constitution Avenue, Northwest, in the District of Columbia, and shown in green on the map of the locality attached to this instrument and made a part hereof, is hereby temporarily turned over to the AMERICAN PHARMACEUTICAL ASSOCIATION the owner of adjoining lands in Square 62 under the provisions of the Act of Congress mentioned subject to the following regulations in addition to the condition contained in the said Act of July 1, 1898

1 That the said AMERICAN PHARMACEUTICAL ASSOCIATION is hereby granted permission temporarily to improve the said parking space, Reservation No 332-B, with walks and shrubbery and to construct a formal approach to its building over the said space all as shown on the map, and the said AMERICAN PHARMACEUTICAL ASSOCIATION shall at all times maintain the ground in a neat and creditable condition to the satisfaction of the said Director of National Parks, Buildings and Reservations

2 That the privileges herein granted are revocable at will by the Director of National Parks, Buildings and Reservations, and whenever notified by the said Director, or his authorized representative, the said AMERICAN PHARMACEUTICAL ASSOCIATION shall immediately remove the walks shrubbery and other improvements from the said parking space and put it in as good condition for use by the United States as it is at this date

3 That if the AMERICAN PHARMACEUTICAL ASSOCIATION at any time ceases to be the owner and occupant of its present building site in the said Square numbered 62, the privileges herein granted shall automatically terminate

WITNESS my hand this 26th day of September 1933

(s) Arno B Cammerer

Director, National Parks, Buildings and  
Reservations

The care of the U S parking space south of Square 62, Reservation No 332-B, and located between 22nd and 23rd Streets and Constitution Avenue, Northwest, is hereby accepted subject to above regulations and to the conditions contained in the Act of July 1, 1898

Dated at Washington D C this 26th day of September 1933

AMERICAN PHARMACEUTICAL ASSOCIATION  
BY (s) Robert L Swain, *President*  
(s) E F Kelly, *Secy*

Owner and Occupant in Square 62,  
Washington D C

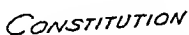
(s) H P Caemmerer

Witness

THE AGREEMENT FOR THE OCCUPANCY OF U S RESERVATION NO 332 A

WHEREAS by Section 2 of the Act of Congress approved July 1, 1898 (30 Stats, page 570) as amended by Act approved April 14 1906 (34 Stats Part 1, pages 112, 113), the Chief of Engineers is authorized temporarily to turn over the care of certain parking spaces in the District of Columbia to private owners of adjoining lands under such regulations as he may prescribe, and with the condition that the said private owners shall pay special assessments for improvements contiguous to such parking, under the same regulations as are or may be prescribed for private lands

NOW, THEREFORE This is to certify that the care of the United States parking space adjoining the south side of Square 88, and located between 21st, 22nd and B Streets, Northwest, in the District of Columbia and shown in green on the map of the locality attached to this instrument, and made a part hereof is hereby temporarily turned over to the National Academy of



(AS GREEN) U S Reservation  
No 332 B

Sciences of Washington, D C, the owner of Square 88, under the provisions of the Act of Congress mentioned subject to the following regulations in addition to the condition contained in the said Act of July 1 1898

1 That the said NATIONAL ACADEMY OF SCIENCES is hereby granted permission to temporarily improve the said parking space with walks and shrubbery, and to construct a low wall along the south boundary line of said space all as shown on the map, and the said NATIONAL ACADEMY OF SCIENCES shall at all times maintain the ground in a neat and creditable condition, to the satisfaction of the Officer of the U S Army in charge of Public Buildings and Grounds

2 That the privileges herein granted are revocable at will by the Chief of Engineers and whenever notified by the Chief of Engineers, or his authorized representative, the said NATIONAL ACADEMY OF SCIENCES shall immediately remove the wall, walks, shrubbery and other improvements from the said parking space and put it in as good condition for use by the United States as it is at this date

3 That if the NATIONAL ACADEMY OF SCIENCES at any time ceases to be the owner and occupant of the said Square Numbered 88 the privileges herein granted shall automatically terminate

WITNESS my hand this 5th day of January 1923

(s) Lansing H Beach

Major General, Chief of Engineers, U S Army

The care of the U S parking space South of Square 88 and located between 21st, 22nd and B Streets, Northwest, is hereby accepted subject to above regulations and to the conditions contained in Act of July 1, 1898

Dated at Washington, D C, this Jan 13, 1923

National Academy of Sciences,  
BY (s) Charles D Welcott,  
President

Owner and Occupant of Square  
No 88, Washington, D C

(s) Paul Brockett

Witness

On the attached plat, the property transferred to the U S A is shown in red, the property transferred to the ASSOCIATION in yellow and U S Reservation No 332 B is shown in green. The bed of Water Street is also shown on the plat and the correction of its southern line

These deeds and agreement were prepared by representatives of the Government and are approved by them. They have been examined and approved by President Swain, Chairman Hilton, Chairman Dunning and Secretary Kelly and titles will be searched and insured by the District Title Insurance Company as for the other property owned by the ASSOCIATION. If approved by the Council they will be promptly recorded and this will close all outstanding questions between the Government and the ASSOCIATION with respect to the site

The Building is completed and ready for occupancy. The Government will proceed promptly with the widening and paving of Constitution Avenue and probably with the widening of 23rd Street. The widening of 22nd Street is still under consideration

On September 15th, the National Capital Park and Planning Commission approved the grading and planting plan, including the approach steps, for the ASSOCIATION's property and for U S Reservation No 332-B as prepared by Mr A F Brinckerhoff with the cooperation of Architect Pope's office. Bids are being obtained on this work and it will be completed this fall except for part of the planting which may have to be carried over until early in the spring. Attached is copy of the Grading and Planting plan. (Not possible to reproduce for the JOURNAL)

As soon as these questions are settled the furniture and equipment will be contracted for

Mr Pope's office is coöperating in the selection of the furniture and equipment It is expected that the Building will be occupied by January first and the lease in Baltimore terminated

*(Motion No 4) It is moved by S L Hillon, Chairman of the Council, that the transfer of properties to and from the United States in Square 62, N W, Washington, D C, as shown in the two deeds, herewith, and plat copy of which is attached hereto, and that the agreement for occupancy of U S Reservation 332 B, herewith, be approved, and that the President and Secretary of the Association be hereby appointed attorneys in fact to sign any deeds, agreements and other papers necessary to complete the transfer of said properties and to accept the said agreement for occupancy*

Dr Dunning submitted the deeds and agreement to his attorney, Mr Vernon Cook, of the firm of Cook and Markell, and below is quoted Mr Cook's reply

"I have your letter of September 29th, and have examined the enclosures with reference to the matter of AMERICAN PHARMACEUTICAL ASSOCIATION and the United States Government The papers are properly drawn to carry out the plan proposed The deed from the ASSOCIATION to the Government conveys a narrow strip of land on 23rd Street, desired by the Government for the widening of that street The deed from the United States to the ASSOCIATION conveys the bed of Water Street opposite your property and straightens the southern boundary The permit granted the ASSOCIATION gives the use of reservation 332 B fronting on Constitution Avenue as an approach to the property of the ASSOCIATION

"You will note that this permit is 'revocable at will by the Director of National Parks, Buildings and Reservations' This provision is the only thing in the plan which might be subject to criticism I suppose, however, that as your ASSOCIATION is dealing with the Government you will have to submit to this provision and also assume that the right therein given the Government therein would not be exercised except for some good and substantial reason

"I think all of the papers are in proper legal form to carry out your plan I enclose the papers under separate cover "

E F KELLY, *Secretary*

### THE RED CROSS

Pharmacists have always given support to the Red Cross and will again do so, hoping for success of the efforts now being made

The Red Cross is the first to respond when a calamity occurs, without red tape—the hungry are fed, clothes are supplied, when needed, the sick and injured are relieved No other permanent organization can do as well when immediate work is to be done

The Red Cross is conducting its annual membership campaign The fee of one dollar is its main support, but unusual calls upon its resources render an additional sum necessary Half of the sum collected is used locally the other nationally We are certain pharmacists will respond and that it is hardly necessary to call special attention—the pharmacist always does his part in work of this kind

Mrs Fischelis, wife of our First Vice-President, Dr Robert P Fischelis, was appointed by Governor Moore of New Jersey as New Jersey's Goodwill Commissioner and brought greetings to President Dawes of A Century of Progress and to Mayor Kelly She was presented to the officials by Mayor Hague of Jersey City As Miss Deer, Mrs Fischelis graduated from St Xavier's Academy in Kenwood (Chicago), and also from the Art Institute The *Chicago American* of August 25th gave an interesting report of the occasion

### RHODE ISLAND COLLEGE OF PHARMACY AND ALLIED SCIENCES

On October 2nd, Rhode Island College of

Pharmacy participated in an NRA parade A beautiful float symbolic of pharmacy, identified the College The main theme attractively displayed, was a prescription signed by "Dr Roosevelt" which was shown on each side of a prescription table and a registered pharmacist was in attendance The prescription read

New Deal  
Confidence  
Cooperation  
Sig—To be taken daily

Officers and members of the faculty headed the division of the College, also students and alumni Fully 300,000 persons viewed the line of march

## EDITORIAL NOTES

*Because of Association Reports, which required many pages publication of a number of papers and items in this Section had to be deferred*

### RELEASE OF THE U S PHARMACO PEIAL REFERENCE COD LIVER OIL OF KNOWN VITAMIN A AND D POTENCY

BY E FULLERTON COOK CHAIRMAN

The U S P Vitamin Advisory Board has just released the "Reference Cod Liver Oil" of known Vitamin potency for use in the standardization of Cod Liver Oil and other products containing Vitamins A and D. This "Reference Oil" has been assayed through a cooperative program including fifteen vitamin laboratories in which the International Standards for Vitamin A and Vitamin D were used as a basis of comparison. The potency of this

Reference Oil has therefore been established upon the basis of International Units and it is available for use in the standardization of all Vitamin A and Vitamin D products both medicines and foods. The method of assay used in the determination of the potency of the "Reference Oil" is that proposed for adoption by "Interim Revision" for the U S P X.

The original draft of the assay as used by the laboratories participating in the preparation of this standard, is also available through the Chairman of the U S P Committee of Revision. Within a short time this assay and the revised text for Cod Liver Oil to be established by "Interim Revision" will be officially announced. This Revision will establish the new Vitamin A and Vitamin D potency for official Cod Liver Oil.

The "Standard Reference Oil" of known vitamin potency, is supplied in 30 cc packages. One lot of the Oil has been assayed for its Vitamin A potency another lot for its Vitamin D activity. A nominal charge of \$2.50 will be made for each 30-cc package. These may be secured in individual packages or in any larger number desired by addressing the Chairman of the U S P Committee of Revision at 43rd Street and Woodland Avenue Philadelphia Pa.

### NO EAGLE NECESSARY ON PACKAGE

Despite the assurance given to the drug and food trades by General Hugh S. Johnson that the Blue Eagle need not appear on packaged products, groups directing NRA work in

various sections of the country are reported as insisting that such identification be utilized. Several instances of pressure brought to bear on manufacturers and retailers have been reported. In many cases the manufacturers are said to be preparing to put the Blue Eagle imprint on their packages rather than experience future difficulties with zealous town committees. However, even those manufacturers who are willing to go to the expense and trouble involved are up against still another condition. They have on their own floors, in warehouses of wholesaler or on the shelves of retailers, heavy stocks of merchandise which do not carry the Blue Eagle. They are endeavoring to find a way for solving the problem, although, with General Johnson's assurance it seems unnecessary to mark the preparations.

### HOUSE PHARMACIES' PROHIBITED

For decades physicians in remote regions of Germany have been permitted, after a special examination, to conduct a so-called house pharmacy in which they themselves were allowed to prepare the necessary medicines. This was a recognized exception to the pharmacy privilege. Now the Prussian ministry of the interior has ordered the cancellation of permits to conduct these house pharmacies. It is pointed out that transportation facilities have improved and that the reasons for house pharmacies seldom hold at present, as physicians can carry with them remedies needed in emergencies. It was explained that house pharmacies not only threaten the existence of the nearest regular pharmacies but also prevent young physicians from settling in rural districts, since the older physicians who possess house pharmacies put them at a disadvantage. There is to be, however, a new investigation to discover whether the need for house pharmacies still exists. The pharmacies of a given district will be required to make arrangements for supplying the population with a reliable drug service—Berlin Correspondent in *Journal A M A*, September 20th.

The Association of Official Agricultural Chemists will be held at Washington, D C, Hotel Raleigh, November 6th-8th. An interesting program, including many papers, has been prepared.



## ADDITIONAL LIST OF REGISTRANTS AT THE MADISON A P H A MEETING

Many visitors at Madison did not enter their names in the Official Registration Book and the cards were received too late for publication

ABRAMS CLARICE A Calumet Mich  
ADAMS W D MR. AND MRS AND NIECE Torney  
Texas  
ADDINGTON JUSTIN W Madison Wis  
ADDINGTON L W MRS, Madison Wis  
ANDERSON ROBERT C Columbus Ind  
ANDREWS SOPHIE K Baltimore Md  
AVERY CHAS H Pasadena Calif

BACON DOROTHY H Cleveland Ohio  
BALLARD C W MRS Mt Vernon N Y  
BARTLETT K A MR AND MRS East Orange N J  
BAUER J C MRS Baltimore Md  
BECKER I A Chicago Ill  
BERGMANN F H Madison Wis  
BEIRNE HUGH P New Haven Conn  
BIBBINS F E MRS Indianapolis Ind  
BIBBINS RUTH MISS Indianapolis Ind  
BINGHAM WILLIAM E Tuscaloosa Ala  
BOWEN J L MRS Chicago Ill  
BOWER STRATTON W Buffalo N Y  
BROWN CLARENCE M MRS Columbus Ohio  
BROWN CHARLES E Madison Wis  
BUCH HARRY H Harrisburg Pa  
BURLAGE HENRY M Chapel Hill N C

CAIN MIRIAM C Seattle Wash  
CASEY J B Tishomingo Okla  
CHARMLEY CHAS C MR AND MRS Madison Wis.  
CHECHIE SAMUEL R Madison Wis  
CHRISTENSEN H C Chicago Wis  
CLARK RALPH W MRS Madison Wis  
CONSIGNY HARRY E MR. AND MRS Madison Wis  
COOK BRUCE S Swarthmore Pa  
COOK THEODORE F Swarthmore Pa  
CREUTZ FRED J Wausa Nebr  
CROCKETT W G Richmond Va

DAY WM B MR AND MRS Oak Park Ill  
DAVIS HENRY MR. AND MRS Madison Wis  
DAVEY EDWARD D MRS Cleveland Ohio  
DAVEY MARY CHRISTINE Cleveland Ohio  
DE KAY GEO MRS Lafayette Ind  
DOAK GEORGE O Madison Wis  
DODDIE CHARLOTTE E Garden City N Y  
DURHAM GRACE R Corvina Mich  
DYE CLAIR A MRS Columbus Ohio

EMANUEL LOUIS MRS Pittsburgh Pa

FANTUS B MRS Oak Park Ill  
FINE ROBERT D Madison Wis  
FINNERAN JAMES MRS Everett Mass  
FISCHLIS ROBERT P MRS Trenton N J  
FORD M N Columbus Ohio  
FREDERICKS FRANK H Cincinnati Ohio  
FUHRMANN CHAS J MRS Washington D C  
FUNK J A J MR. AND MRS Galveston Ind

GAYLE JOHN W Frankfort Ky  
GLOVER CLIFFORD C Ann Arbor Mich  
GLOVER W H MRS Lawrence Mass  
GRIMM H J MR. AND MRS Madison Wis

HANKINS W MAXWELL Daytona Beach Fla  
HARRIS CARL G A Newton Center Mass  
HARRIS LOYD E MRS Norman Okla  
HARWOOD ARTHUR A Valparaiso Ind  
HAYMAN LUCILLE B MRS Morgantown W Va  
HAYMAN ALICE Morgantown W Va  
HEBBERT ARTHUR E La Crosse Wis  
HEIN HENRY F MRS San Antonio Texas  
HELMS SAMUEL T Baltimore Md  
HENRY BESSIE MAY Laurel Mich  
HOGSTAD ANTON JR St. Louis Mo

JACOBS MARION L MRS Chapel Hill N C  
JEPSON P J MRS Newton Iowa  
JORDAN C B MRS La Fayette Ind  
JUDN CORNELIUS M Rochester Minn  
JUNISCE GEORGE Ames Iowa

KELLY CHARLES U New Orleans La  
KELLY E F Baltimore Md  
KENDIG H EVERT Chestnut Hill Pa  
KINO A H MR AND MRS Manhattan Kans  
KINO F H Delphos Ohio

KOTTE NELLE C Cincinnati Ohio  
KRANTZ J C JR. MRS Baltimore Md  
KREHMERS E MR AND MRS Madison Wis  
KUEZNI ERNEST G Madison Wis  
KUNDERT TOM Madison Wis

LAGROSSE J MR AND MRS Madison Wis  
LAMPHERE R O MR AND MRS Madison Wis  
LAUGHLIN JOHN D Madison Wis  
LEA JAMES M Danville Va  
LEE CHARLES O MRS Lafayette Ind  
LEE JOHN W Washington D C  
LEIGH BLANCHE W Gainesville Fla  
LLOYD J T MR AND MRS Cincinnati Ohio  
LOFGREN FREDERICK V Valparaiso Ind

MALLATT A F MR AND MRS Madison Wis  
MANSON HELEN C Hudson Mass  
MCDOWELL E W MR AND MRS Madison Wis  
MEAGS WALTER F MR. AND MRS Des Moines Iowa  
MEISSNER F W MRS La Porte Ind  
MENDES A F MRS Madison Wis  
MILNE FRANK A MR. AND MRS Pratt Kans  
MOTLEY P T Columbia S C  
MULDOON HUGH C Pittsburgh Pa  
MUNCH JAMES C Lansdowne Pa

NEWTON HOWARD C MR AND MRS AND DAUGHTERS  
Omaha Nebr  
NORDRUM O M MRS St Paul Minn

O DAY DAVID W Boulder Colo  
OSOL ARTHUR MRS Philadelphia Pa

PATELSKI RAY A Aurora Ill  
PLAXCO JAMES M Due West S C  
PURDUM WILLIAM A Baltimore Md

RENNEDOHM OSCAR MRS Madison Wis  
RICHARDS LEON W MRS Missoula Mont  
RICHTMANN MATILDA M Madison Wis  
RIEMENSCHNEIDER JULIUS H MR AND MRS Chicago  
ROACH THOMAS MR AND MRS AND DAUGHTER  
Oklahoma City Okla  
ROCCA JOHN C MR AND MRS Madison Wis  
RODMAN ROBERT W Bloomfield N J  
ROSIN JOSEPH Rahway N J  
ROTHROCK R B MRS Evansville Ind  
ROWE LEWIS W Detroit Mich  
RUSSELL O E MRS Elkhart Ind

SCHARFRER ELIZABETH K Yonkers N Y  
SCHARFRER E C A Brooklyn N Y  
SCHLICHTING HAROLD E MRS Lansing Mich  
SCHNAIDT H J MRS Parkston S Dak  
SCHULTZ R C Worland Wyo  
SLAMA LILLIAN Baltimore Md  
SONNENBURG AMELIA A Baltimore Md  
SPEASE EDWARD MR AND MRS Cleveland Ohio  
SPIELMAN ELEANOR R Baltimore Md  
STEEN ARTHUR L Madison Wis  
STEVENS ELIZABETH B Indianapolis Ind  
STEOUD GERTRUDE R Pittsburgh Pa

TAN VIDAL A Manila P I  
THAYER J R Webster Groves Mo  
THOMPSON HOMER B Oak Park Ill  
TIENEMAN RUDOLPH J Madison Wis  
TURNER P R MR AND MRS Marianna Ark

UEL MARGARET H Madison Wis  
UREAN LEOPOLD C Milwaukee Wis

WALKER PERCY S Topeka Kans  
WEAVER E E San Antonio Texas  
WEBSTER G L MRS Chicago Ill  
WHELFLEY LAURA E St Louis Mo  
WHITNEY H A K MRS Ann Arbor Mich  
WILCOX WAYLAND D MR AND MRS Philadelphia Pa

WILHELM GEORGE MR. AND MRS Newport Ky  
WILSON ROBT C MRS Athens Ga  
WILLSON FRANK E MR AND MRS Detroit Mich  
WOODSIDE JOHN M Philadelphia Pa

ZUFALL C J MRS West Lafayette Ind

## SOCIETIES AND COLLEGES

## N A R D RESOLUTIONS

The National Association of Retail Druggists adopted twenty one resolutions the more important of which are summarized by the *Drug Trade News* as follows To aid the Government in preparing and enforcing NRA codes and to seek to incorporate in such codes provisions which will put the independent druggist on a sound business basis To urge the NRA to include the right of contract in the retail drug code and to seek the continuation of the policy which now exempts professional men from the provisions of the highest code To ask President Roosevelt that the selling provisions of the druggists' code allow for overhead and a reasonable net profit To ask General Johnson to appoint small independent druggists as advisers to NRA officials in charge of the retail code That the practice of wholesale druggists or manufacturers engaging directly or indirectly in the retail drug business be condemned That the giving of full sized packages to physicians as samples be condemned That the practice of some manufacturers who mention only a few dealers in advertising where their preparations may be obtained be condemned That after repeal of the 18th Amendment steps be taken to obtain alcohol for manufacturing purposes under the same conditions as obtained by the large manufacturer

That efforts be made to stop manufacturers from granting wholesale rates to certain retailers

## OFFICERS

The following officers were elected *President*, Monte L Powell, Denver Colo, *First Vice-President*, H L Chichester Macon Ga, *Second Vice-President*, George C Bingham New York City, *Third Vice President* Zack Kerrigan, St Louis Mo, *Secretary* John W Dargavel Minneapolis, Minn, *Treasurer* Oscar Rennebohm Madison Wis, *Members of Executive Committee*, *Chairman*, Harvey A Henry, Los Angeles Calif George L Secord, Chicago, Ill, John Witty Portland, Ore

## OFFICERS OF FEDERAL WHOLESALE DRUGGISTS' ASSOCIATION

H J Krupp, Philadelphia was elected president of the Federal Wholesale Druggists'

Association at its eighteenth annual convention L E Selberlich, New York City, was elected *Vice-President*, G A Raab Baltimore, was re elected *Treasurer*, R E L Williamson was re elected *Secretary*

The outlook for the wholesale drug trade was declared by officers and members of the Association to be favorable in general, and consensus appeared to be toward considerable optimism

Details of plans for adjusting the affairs of members of the Association in accordance with the principles of the NRA formed an important part of the discussions in the meeting, which was well attended by a large number of members Providence, R I, was selected for the 1934 meeting

## NATIONAL WHOLESALE DRUGGISTS ASSOCIATION

Disapproval of the proposed revision of the Federal Food and Drugs Act, on the ground that it would not improve the present Federal and State laws and would add confusion and expense, was expressed by the National Wholesale Druggists' Association Among other resolutions, the following are summarized as follows Recommended discontinuance of sale of 10-cent lines in pharmacies Asked its members to instruct buyers and salesmen to support manufacturers whose policies protect the profit of wholesaler and retailer Recommended that members refrain from selling drug store merchandise to grocery stores in towns where drug stores are located Reiterated stand that most satisfactory basis of compensating salesmen is a graduated rate of commission on total net sales Authorized survey of all types of insurance looking toward savings through centralized insurance if fifty members will cooperate in such survey

## NEW OFFICERS

*President*, Henry D Faxon, Kansas City, Mo *Vice-Presidents*, J Mahlon Buck, Philadelphia, J B McCormick, Pittsburgh, E H DeMoss, Louisville, C H Gertridge, Seattle, Kayton Smith, Savannah *Members of the Board of Control* (three year term) John C Davis Denver, Lee Wilson Hutchins, Grand Rapids Mich, Charles A Loring, Boston William J Murray Columbia, S C

The convention was presided over by President Carl F G Meyer The assemblage was

welcomed by Thomas Taggart and Judge M L Fansler. Delegates from fifteen organizations in the drug trade were received, and the greetings of the pharmaceutical press were extended by Walter H Cousins, Dallas, Texas.

Secretary E L Newcomb gave a detailed report on the year's activities of his office. Encouraging and informative reports were presented at the several sessions by the standing committees of the association. The suggestions and recommendations of the secretary and committees were considered by the Board of Control and found expression in the report of that body and in the resolutions.

The registration at the meeting totaled about 550.

White Sulphur Springs, W Va., was selected as the place for the meeting next year.

#### MARYLAND ASSOCIATION

A regional meeting of Maryland Pharma-

ceutical Association was held October 17th at Hagerstown. Dr I M Wertz, Mayor of Hagerstown, welcomed the members at a Luncheon—the speakers were President L V Johnson and A F Ludwig, and response was made by Harry R Rudy. Harry S Harrison and A F Ludwig reported on the A Ph A Convention and L M Kantner, Aquilla Jackson and L V Johnson on the meeting of the N A R D.

Other contributors to the program were A A M Dewing, on "Contacting the New Comer," "Professional Pharmacy as I See It," S L Hilton, "Physio-Therapy Methods and Appliances," M J Faden, "Building Professional Pharmacy," Simon Solomon, "National Legislation," W Bruce Philip, "U S P and N F Publicity," Marvin J Andrews.

C W Smith, NRA, Washington, addressed the meeting at the Dinner.

### OBITUARY

#### CHARLES C PLITT

Dr Charles C Plitt, member of the AMERICAN PHARMACEUTICAL ASSOCIATION and professor of Botany at the School of Pharmacy, University of Maryland, died at his home in Baltimore October 13th, after an illness extending over several months.

Dr Plitt was born in Baltimore, May 6, 1869, and received his early education in the public schools of this city and a degree in pharmacy at the old Maryland College of Pharmacy in 1891. He was an instructor in Botany and General Science in the public schools of Baltimore and for many years taught at the City College. For a number of years he was part time professor of Botany and Materia Medica at the School of Pharmacy and on the retirement of Dr David R M Culbreth, Dr Plitt was given full professorship.

Dr Plitt's collection of lichens, which was considered among the first three collections in the United States, was presented by him to the Maryland Academy of Science.

Two years ago Dr Plitt led a group of Johns Hopkins University students on a research expedition to Jamaica. For quite a number of years he headed a group of public school teachers on excursions into Maryland's fields and conducted similar groups of the Maryland

Academy of Science on collecting expeditions throughout the state.

Dr Plitt was a frequent contributor to periodicals and a member of the American Association for the Advancement of Science, of the Botanical Society of America of the Ecological Society of America.

The deceased is survived by his widow and three sons, Walter, George T and Allen R Plitt.

#### WOODS A CAPERTON

Woods A Caperton, for many years associated with Eli Lilly & Co., died from a heart attack on October 10th at his home in Indianapolis. He retired from active business July 1932, and following that Mr and Mrs Caperton took an extended tour through Europe and other parts of the world.

In a minor capacity Mr Caperton was engaged with Behrens Drug Co in Waco, and for a time with W B Morrison, retail pharmacist, of the same city. In 1902, he engaged with Eli Lilly & Co as representative in Texas. Four years later he became Assistant Sales Manager at the home office, in 1912 he was promoted to the position of Sales Manager.

Mr Caperton was well and favorably known in wholesale and manufacturing circles. He

was a member of a number of clubs and fraternities

The deceased is survived by his widow, two daughters and one son

#### GEORGE A KELLY

George A Kelly, third vice-president of the George A Kelly Co., wholesale druggists of Pittsburgh, was killed in an automobile accident October 8th. Mr and Mrs Kelly were returning from the meeting of the National Wholesale Druggists' Association at French Lick to spend a few days at Hot Springs. Their car left the road at a curve and plunged over an embankment, Mrs Kelly died in a hospital on October 9th from injuries received in the crash.

Mr Kelly was born in Pittsburgh, November 10, 1901, and was an alumnus of Princeton University. Mrs Kelly was the daughter of the late Douglas Stewart, a former director of Carnegie Museum.

#### WILLEM STORM VAN LEEUWEN

On July 13th there died in the prime of life one of the leading pharmacologists of Europe. Willem Storm van Leeuwen was born in Kampen, Holland, on December 7, 1882.

The earlier researches of Storm van Leeuwen dealt with anesthesia and narcosis. Another important earlier contribution was a study on the relation between the concentration and biological effect of drugs and poisons. This research led him into the fascinating field of synergism and antagonism of drug mixtures in which he was a pioneer worker. In addition to miscellaneous researches on digitalis, helladonna, ergot, vitamins, etc. Professor Storm van Leeuwen devoted much of his time during

the last decade to the study of asthma, hay fever and various forms of allergy. Here some of his most valuable contributions to medicine were made. He was one of the earliest investigators to emphasize the importance of air conditioning, that is, of freeing the air of all allergic particles in connection with the treatment of patients suffering from such diseases. Being interested not only in theoretic pharmacology but also in its practical applications to therapeutics, Storm van Leeuwen combined laboratory researches with clinical guests which he carried on in a private clinic of his own and also in the municipal hospital at Leiden. His studies on bronchial asthma and other allergic diseases led him into the domain of climatology and meteorology, so that in the last few years of his life he spent considerable time at Innsbruck, observing the effects of atmospheric electricity, ionized gases and various meteorological factors on physiological and pharmacological phenomena.

Professor Storm van Leeuwen's publications number more than 150, and fully half of them deal with various phases of anaphylaxis, allergy and allied conditions. Next in importance are his papers on synergism and antagonism of drugs. Other publications deal with the absorption of poisons, the influence of colloids on the action of drugs, the relation of avitaminosis to pharmacological action, the pharmacology of sulphur, salicylates, hypnotics, anesthetics, tuberculin and other drugs. He was also the author of several larger handbooks. The most important of these are his "General Pharmacology," written in Dutch, and his treatise on "Allergic Diseases" published in Dutch, German and English.—DAVID I. MACHT in *Science*

*A New Nomenclature of Chemistry*—Lyman Spalding—AMERICAN PHARMACEUTICAL ASSOCIATION, \$1.00. When Lyman Spalding, known now as the Father of the United States Pharmacopoeia, was lecturer on chemistry in Dartmouth University, he issued for the benefit of his students "A New Nomenclature of Chemistry Proposed by Messrs. De Morveau, Lavoisier, Berthollet and Fourcroy" with a few additions and improvements of his own. The AMERICAN PHARMACEUTICAL ASSOCIATION has now published a reproduction of the original 1796 leaflet of Spalding's. Students and teachers of chemistry or of pharmacy who are interested in the history of their sci-

ences will welcome this little booklet which retains the quaint flavor of the original in its typography.—*Science News Letter*

The *Journal of Chemical Education* has accepted the generous invitation of the University of Chicago, extended through Julius Steglitz, to occupy editorial quarters in the Chemical Laboratory at the university. The editor, Otto Reinmuth, expects to be fully installed in his new quarters immediately after the meeting of the American Chemical Society in Chicago. The business and publication offices of the JOURNAL will remain at the plant of the Mack Printing Co., Easton, Pa., as heretofore.

## INDUSTRIAL RECOVERY ACT

## SCHEDULE A — SUPPLEMENTAL PROVISIONS

## SECTION 2

## Applicable to Retail Drug Establishments and to All Retailers Dealing in Drugs and Allied Products

In addition to the foregoing<sup>1</sup> provisions of this Code the following supplemental provisions shall apply in retail drug establishments and to all retailers dealing in drugs and allied products

## SECTION 1

**Definitions** (1) **Retail Drug Trade**—The term retail drug trade as used herein shall mean all selling to the consumer and not for the purpose of resale in form of drugs medicines cosmetics toilet preparations drug sundries and/or allied items in the continental United States excluding the Panama Canal Zone. It is provided however that the term retail drug trade shall not include the dispensing of drugs medicines and medical supplies by a physician dentist surgeon or veterinarian in the legitimate practice of his profession.

(2) **Drug Retailer**—The term drug dealer as used herein shall mean any individual or organization engaged wholly or partially in the retail drug trade.

(3) **Retail Drug Establishment**—The term retail drug establishment as used herein shall mean any store or department of a store engaged in the retail drug trade but shall not include stores or departments in which the principal business is the selling at retail of products other than drugs medicines cosmetics toilet preparations drug sundries and/or allied items.

(4) **Drugs**—The term drug as herein used shall mean all medicinal substances and preparations recognized in the U. S. Pharmacopoeia and National Formulary or any supplements thereto and all substances and preparations intended for external or internal use in the cure mitigation treatment or prevention of disease in man or other animals and all substances and preparations other than food (but including medicinal or quasi medicinal preparations such as those sold or produced primarily for their vitamin content) intended to affect the structure or any function of the body of man or other animals.

(5) **Cosmetics and Toilet Preparations**—The term cosmetics and the term toilet preparations as used herein shall mean toilet articles and perfumes toilet waters face powders face creams rouges shaving creams dentifrices soaps and similar substances and preparations designed and intended for application to the person for the purpose of cleaning improving the appearance of refreshing or preserving the person.

(6) **Drug Sundries**—The term drug sundries as used herein shall mean such articles as are used in conjunction with but not included in drugs cosmetics or toilet preparations.

(7) **Registered Pharmacist, Assistant Pharmacist, Apprentice Pharmacist**—The terms registered pharmacist assistant pharmacist and apprentice pharmacist as used herein shall have the meaning given to them under the laws of the respective states of the United States and of Alaska.

(8) **Curb Boys or Girls**—The term curb boys or girls as used herein shall mean employees engaged exclusively in serving curb customers.

<sup>1</sup> Code of Fair Competition for the Retail Trade as approved by the President October 22 1933. This has been published in the Press and not reprinted herein.

**Store Hours and Hours of Labor** (1) **Group D, for Retail Drug Establishments**—In place of any of the schedules of store hours and hours of labor set forth in Article V Section 1 retail drug establishments may elect to remain open for business seven (7) days a week for a total of eighty four (84) hours or more per week but on no day for less than eight (8) hours no employee of such establishment except as provided in Article V Sections 4 and 5 shall work more than fifty six (56) hours per week nor more than ten (10) hours per day nor more than thirteen (13) days in any two consecutive weeks.

(2) **Exceptions in Case of Pharmacists**—The maximum hours of labor prescribed in Article V and in paragraph (1) of this Section shall not apply to registered pharmacists assistant pharmacists and apprentice pharmacists employed and working as such who may work ten (10) per cent above maximum hours otherwise applicable or more in cases of emergency.

## SECTION 3

**Wages** (1) **Basic Rates for Retail Drug Establishments Electing to Operate in Group D**—No employee of a retail drug establishment which has elected to operate in Group D as set forth above shall except as provided in Article VI Sections 2 and 3 be paid for a fifty six (56) hour work week less than at the rate of \$16 per week in cities of over 500 000 population or less than at the rate of \$15 per week in cities of from 100 000 to 500 000 population or less than at the rate of \$14 per week in cities of from 25 000 to 100 000 population in cities towns and villages of from 2500 to 25 000 population the wages of all classes of employees of such establishments shall be increased from the rates existing on June 1 1933 by not less than twenty (20) per cent provided that this shall not require an increase in wages to more than the rate of \$11 per week and providing further that no employee shall be paid less than at the rate of \$10 per week in towns villages and other places with less than 2500 population the wages of all classes of employees of such establishments shall be increased from the rates existing on June 1 1933 by not less than twenty (20) per cent provided that this shall not require an increase in wages to more than the rate of \$10 per week.

(2) **Exceptions for Establishments Employing Curb Boys or Girls**—The minimum wages prescribed in Article VI and paragraph (1) of this Section may not apply to curb boys or girls employed by retail drug establishments when such employees are paid upon a commission basis.

## SECTION 4

**Trade Practices**—In addition to the trade practices set forth in Article IX all drug retailers shall comply with the following:

(a) No drug retailer shall substitute another article or any part thereof for the kind ordered without due notice to and consent of the customer.

(b) No drug retailer shall advertise to fill prescriptions at a uniform price irrespective of cost of ingredients or quantity prescribed.

(c) No drug dealer shall permit any demonstrator or sales employee whose salary is wholly or partially paid by a manufacturer or distributor to work in his establishment unless such demonstrator or sales em-

ployee is clearly and openly identified as the agent of such manufacturer or distributor

#### SECTION 5

**Administration**—The administration of this Code including this Schedule in so far as it relates to the retail drug trade shall be governed by the following provisions

(1) **Retail Drug Trade Authority**—The Retail Drug Trade Authority shall consist of Administrator or his deputy and three members appointed by the President of the United States who shall advise and assist the Administrator or his Deputy. Members of the Retail Drug Trade Authority shall be members without vote of the National Drug Trade Council provided for hereinafter

(2) **National Drug Trade Council** (a) **Composition**—The National Retail Drug Trade Council shall consist of one representative from the AMERICAN PHARMACEUTICAL ASSOCIATION one representative from the Drug Institute of America Incorporated two representatives from the National Association of Retail Druggists and such representation from any national association of the retail drug trade as may be approved by the Administrator

Such representatives shall be elected in accordance with a fair method approved by the Administrator by the respective national trade associations

(b) **General Powers**—The National Retail Drug Trade Council shall in addition to the specific powers herein conferred have all general powers necessary to assist the Administrator or his deputy in the administration and enforcement of the Code in so far as it relates to the retail drug trade

(c) **Reports and Investigations**—The National Retail Drug Council shall subject to the approval or upon request of the Administrator require from all drug retailers such reports as are necessary to effectuate the purposes of this Code in so far as it relates to the retail drug trade and may upon its own initiative or upon complaint of any person affected make investigation as to the functioning and observance of any provisions of the Code relating to the retail drug trade and report the results of such investigation to the Administrator

(d) **Recommendations**—The National Drug Trade Council may from time to time present to the Administrator recommendations (including interpretations) based on conditions in the retail drug trade which will tend to effectuate the operation of the provisions of this Code and the policy of the National Industrial Recovery Act. Such recommendations shall upon approval by the Administrator become operative as part of this Code

(e) **Local Committees**—The National Drug Trade Council shall subject to the approval of the Administrator supervise the setting up within local trading areas of local committees for the purpose of assisting in

the administration and enforcement of this Code within such local areas in so far as it relates to the retail drug trade

(f) **Expenses**—The expenses of the National Drug Trade Council shall be equitably assessed and collected by the Council subject to the approval of the Administrator

(3) **Interpretation**—The Administrator may from time to time after consultation with the National Retail Drug Council issue such administrative interpretations of the various provisions of this Code relating to the retail drug trade as are necessary to effectuate its purposes and such interpretations shall become operative as part of this Code unless the Administrator shall otherwise specify

(4) **Exceptions in Cases of Unusual or Undue Hardship**—Where the operation of the provisions of this Code imposes an unusual or undue hardship upon any drug retailer or group of drug retailers such drug retailer or group of drug retailers may make application for relief to the Administrator or to his duly authorized agent and the Administrator or his agent may grant such exception to or modification of the provision of this Code as may be required to effectuate the purposes of the National Industrial Recovery Act.

#### EXECUTIVE ORDER.

An application having been duly made pursuant to and in full compliance with the provisions of Title I of the National Industrial Recovery Act approved June 16 1933 for my approval of a Code of Fair Competition for the Retail Trade and hearings having been held thereon and the Administrator having rendered his report containing an analysis of the said Code of Fair Competition together with his recommendations and findings with respect thereto and the Administrator having found that the said Code of Fair Competition complies in all respects with the pertinent provisions of Title I of said Act and that the requirements of clauses (1) and (2) of subsection (a) of Section 3 of said Act have been met **NOW THEREFORE** Franklin D. Roosevelt President of the United States pursuant to the authority vested in me by Title I of the National Recovery Act approved June 16 1933 and otherwise do adopt and approve the report recommendations and findings of the Administrator and do order that the said Code of Fair Competition be and is hereby approved

FRANKLIN D. ROOSEVELT *President*

Approval Recommended

HUGH JOHNSON *Administrator*

The White House October 22 1933

**NOTE** Prompt action is being seriously considered to urge that changes be made in the provisions of Schedule A " where they differ materially from the Code presented by the organizations representing pharmacy and the retail drug industries

#### DRUG TRADE NAMES LISTED

A list of trade names in use by members of the American Drug Manufacturers' Association and the American Pharmaceutical Manufacturers Association has been prepared under the auspices of the patent and trade mark committees of the associations

The purpose of the compilation is to furnish information in the preliminary consideration of new trade names. It has been revised to September 1st

Copies may be obtained at 25 cents each from Carson P. Fraley, secretary of the American Drug Manufacturers Association, Albee Building, Washington

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXII

NOVEMBER, 1933

No 11

## THE CHAIRMAN OF THE HOUSE OF DELEGATES, AMERICAN PHARMACEUTICAL ASSOCIATION, 1933-1934

Patrick H Costello was born in Sauk Center, Minnesota, in 1896. He completed a 2-year college pre-medical course at the University of North Dakota and, in 1917, graduated in pharmacy in North Dakota Agricultural College, School of Pharmacy, at Fargo.

During the World War Mr Costello served in the Medical Department of the U S Army. In 1919, he purchased the retail drug store in Cooperstown, still owned by him. He became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1923, in 1924, he was elected president of North Dakota Pharmaceutical Association and, in 1927, was named treasurer of this organization and is still serving in that capacity.

In 1927, Mr Costello was appointed to fill an unexpired term on the North Dakota Board of Pharmacy and two years later he was re-appointed member for the 5-year term, since 1927, he has served as secretary of the board. The State Association passed resolutions expressing its appreciation of the good work being done by the board and its efficient secretary.

Chairman P H Costello, of the House of Delegates, held the vice-chairmanship of the House during the past year.

The subject of this brief sketch is a member of Beta Theta Pi and of the Masonic bodies.

Mr and Mrs Costello have one son, aged 12 years.

---

### *A Ph A Resolution No 4 Federal Food and Drug Law*

*Resolved*, that the AMERICAN PHARMACEUTICAL ASSOCIATION record its approval of the proposed changes in the Federal Food and Drug Law in so far as they provide for more effective protection of the public health, and be it further

*Resolved*, that in the interest of a sound public policy the delegation of arbitrary discretionary powers in connection with the enforcement of Food and Drug legislation be disapproved.

# EDITORIAL

E G EBERLE EDITOR

10 West Chase Street, BALTIMORE, MD

## INDIVIDUALITY AND RESPONSIBILITY

WE ARE hopeful that the National Recovery Act will be productive of results that will establish peace and plenty and a better understanding of responsibilities in connection with the obligations of citizenship

It remains to be seen just how the public will fare under a union of state with what is termed by some "an integrated and highly mechanized modern business"—we must be stimulated by hope, but realize the many difficult problems that are to be solved, and "do our part"—Return prosperity depends on the average citizen

In closing an editorial of the August JOURNAL it was said that "codes are essential but also a determination to establish better conditions and uphold them and, to that end, the public must take a greater interest in forcing compliance with honest practices, because of its responsibility for disturbing conditions, due to indifference, greed and selfishness"

In Pharmacy, individuality is an outstanding quality—influential for great good, if it is marked by superiority and not by an inferiority complex. The public expects and receives from pharmacy a service that represents more than the average lay man recognizes, unless knowledge comes to him through experience, or when he acquires knowledge through education, as at the Century of Progress, where much information relative to pharmacy was revealed to the visitors as something new—it was most interesting to watch the expression of inquiry on many faces

Individuality and responsibility have a value in establishing the standing of the pharmacist in professional activities. Pharmacy is known by its service and the pharmacist by his personality and devotion to pharmaceutical duties. These qualifications and training of the pharmacist represent the highest type of good publicity, of a kind that requires neither bugle nor colors—a message that communicates and strengthens confidence. A few months ago a pharmacist, in a city of less than 30,000, after considerably more than a half century of services, concluded his pharmaceutical practice. His individuality as pharmacist developed and was maintained throughout the years of his active life, without being disturbed by an adjacent drug store of another type, but which he did not consider competitive

Other pharmacists come to mind, whose perfect packages or products marked the respective pharmacies. These men cultivated individuality and—in their own way, modestly but persistently—they capitalized it

It may be necessary to arrange and adapt the conduct of business, but pharmacy has a place of service, for thereby life and health are protected. Individuality marks the pharmacist and responsibility characterizes him. The many divisions of the sciences contributing to pharmacy have given pharmacists opportunities that enable them to render distinguished services in all of them—they have shown this by their works



## PLANS FOR INCREASING THE MEMBERSHIP IN THE A. P. H. A.

THE AMERICAN PHARMACEUTICAL ASSOCIATION, throughout its long and eventful history, has been devoted to the more intrinsic phases of pharmaceutical work. It has been the dominant influence in the professional and educational field. Its force and prestige have been brought to bear upon legislation, upon the standardization of drugs and medicines, and upon the various efforts which have advanced pharmacy in the field of public health. Every worth-while suggestion for the betterment of pharmacy has received the earnest support of the ASSOCIATION. From time to time the ASSOCIATION has courageously stood for basic principles, and has never faltered in its adherence to sound professional and economic ideals. Just as courageously, the ASSOCIATION has opposed many movements, popular enough for the moment, but which were certain to be harmful in the course of time. In other words, the ASSOCIATION has stood as a beacon light, bearing the brunt of passing storms, yet always pointing the direction in which pharmacy might safely move.

It is from this proud background that I have endeavored to bring a larger number of pharmacists into the ASSOCIATION. I feel that all members of pharmaceutical faculties, all members of boards of pharmacy, all state association officers should, because of their peculiar duties and obligations to pharmacy, be active members in the AMERICAN PHARMACEUTICAL ASSOCIATION. Invitations have been extended to them, facts and information have been supplied, and I am confident that many will become members, and take an active part in the affairs of the ASSOCIATION.

All plans are now in progress for interesting the great retail group. I have asked the members of the A. P. H. A. state membership committees to furnish me with the names of those pharmacists who might be interested in the fundamental work carried on by the ASSOCIATION. Invitations will be sent to all whose names are submitted. Special care will be given to presenting the work, the history, the plans and ideals of the ASSOCIATION and their relationship to the every-day work of pharmacists. I believe that the great rank and file of pharmacists will be better fitted for their responsible professional duties by membership in the ASSOCIATION. The ASSOCIATION, too, will be placed in a better position, and thus more able to meet the demands made upon it, by a stronger and larger membership.

I have also arranged to write a special monthly letter to all state association officers dealing with some phase of current events of interest to pharmacists. I shall do this first as my contribution to a better understanding of things going on around us, and second to bring the A. P. H. A. more closely into the thoughts and plans of the officers of state associations.

My hope is that these efforts may be mutually helpful to the ASSOCIATION and to the great professional group that it serves. I earnestly request the cooperation of the membership throughout the country, so that these plans and efforts may be reasonably successful.—ROBERT L. SWAIN, *President*

## SCIENTIFIC SECTION

BOARD OF REVIEW OF PAPERS—*Chairman*, L W Rowe, George D Beal F F Berg C O Lee, E V Lynn John C Krantz Jr, Heber W Youngken

### QUANTITATIVE APPLICATIONS OF THE MODIFIED TURK TEST \*<sup>1</sup>

BY JAMES C MUNCH, HARRY J PRATT AND AMELIA M DE PONCE

A number of local anesthetics, analgesics, hypnotics and sedatives have been tested for their relative potencies on intact frogs or on isolated tissues (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13) Qualitative tests have been made by painting the skin, by direct immersion of the entire frog, or of one or both feet Tests upon the sensitivity of the frog's foot have been conducted under a procedure to which the name "Turk" Test is applied *Rana pipiens* (frogs) weighing between 15 and 40 Gm were stored in running water at temperature of 15° C for several days before use Each frog was then removed from the storage bath and the brain destroyed by pithing In a few instances Van Leeuwen's suggestion to decerebrate or decapitate was followed, but without improving the delicacy or accuracy of the method (6) After an interval of from five to ten minutes, to allow shock to pass off, the sensitivity of each frog was determined by immersing both feet in an *N*/10 solution of hydrochloric acid Suitable frogs jerked out both feet from the acid within five seconds or less, frogs not showing this degree of sensitivity were discarded The feet were then washed free from acid with water One foot was immersed in the test solution, the other being used as a control At the expiration of the desired time interval, measured by watch or interval timer, any adhering solution was wiped from both feet with a towel and both feet at once placed in *N*/10 hydrochloric solution Special pains were taken to avoid injuring the skin during the wiping process A positive result was recorded when the frog jerked out the untreated foot within five seconds or less, while the treated foot remained in the acid solution for five to thirty seconds, or even longer In a number of experiments we found that soaking the treated foot in water for several minutes failed to cause a return of the original susceptibility and therefore no attempts were made to conduct more than one test on each foot The first result obtained on a frog was felt to be more nearly quantitative, after a rest period, a qualitative test was conducted, immersing the foot which originally had served as a control and using the foot originally treated as the control for the second test

For periods of immersion of 120 seconds or less, tests were made on different frogs at five-second intervals, for periods between two minutes and five minutes, at ten-second intervals, for periods longer than five minutes, thirty-second intervals Results obtained upon five to ten frogs at each concentration are averaged Plotting the concentrations against the average time in seconds the observation values suggest a curve with a trend toward an exponential, logarithmic or hyperbolic curve When the logarithms of concentrations are plotted against the average time in seconds, results approach a straight line for periods up to 120 seconds A different type of curve appears to develop at about two minutes' immersion

\* Scientific Section A PH A, Madison meeting 1933

<sup>1</sup> Department of Pharmacology, Sharp and Dohme, Philadelphia, Pennsylvania

Statistical studies of the curves obtained in less than 120 seconds suggest that an interval of immersion of 60 seconds is the proper time for induction of analgesia (at least on a comparative basis)

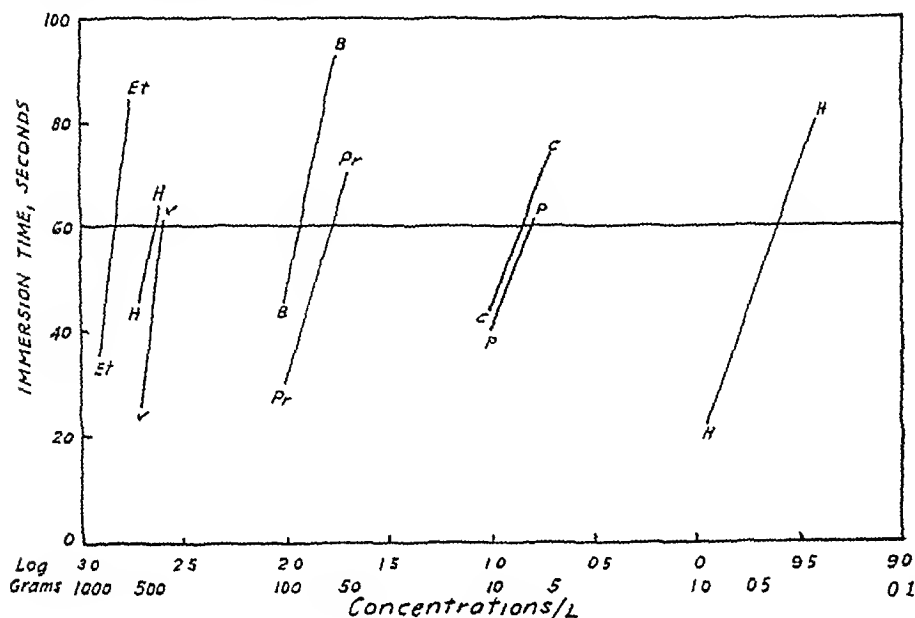


Fig 1—Induction of anesthesia—Türk test

The detailed results obtained in testing a number of products are given in Fig 1 and Table I. The estimated isoanalgesic concentrations for 60-second immersion periods have been interpolated from the curves when feasible.

TABLE I—ISOANALGESIC CONCENTRATIONS BY TÜRK TEST  
(60-Second Immersion)

Product	Concentration (Gm per Liter)	Product	Concentration (Gm per Liter)
Hexylresorcinol	0.45	Urethane	25.0
Morphine Sulphate	5.0	Procaine	62.0
Phenol	7.2	Borocaine	85.0
Cocaine	7.5	Chloral Hydrate	330.0
Beta Eucaine	10.0	Valerian	400.0
Chloretone	25.0	Hops	450.0
Nembutal	25.0	Ethyl Alcohol	680.0

The early attempts to use this method are not capable of giving quantitative results, because of the effects of a large number of variables which appear to influence the end result. However, as one becomes accustomed to this type of testing it is possible to obtain better agreement. In some animals it is almost impossible to get quantitative results, although the qualitative findings are in harmony with previous tests upon other frogs. Using a sufficient number of frogs, it is believed that differences of plus or minus ten per cent may be detected by this method.

## CONCLUSION

Using a period of 60 seconds immersion, and using a sufficient number of frogs, it is possible to detect variations of plus or minus ten per cent in the concentration of local anesthetics, analgesics, hypnotics and sedatives

## BIBLIOGRAPHY

- (1) M L Bonar and T Sollman, "The Effects of Some New Local Anesthetics" *J P E T*, 18 (1921), 467-489
- (2) K Fromherz, 'Phenylurethanderivative als lokalanesthetica, *A E P P*, 76 (1914), 257-302
- (3) K Fromherz, "Ueber die wirkung verschiedener gruppen der lokalanesthetica im lichte verschiedener untersuchungsmethoden" *Ibid*, 93 (1922), 34-91
- (4) J R Heinekamp, 'Studies in Local Anesthetics III The Pharmacology of Some *p* Aminobenzoate Compounds Türks Reflex Method in the Determination of Local Anesthetics' *J Lab Clin Med* 11 (1925) 289-292
- (5) H H Jensen and A D Hirschfelder 'Studies upon the Local Anesthetic and Antispasmodic Actions of Some Ethers and Esters of Saligenin," *J P E T*, 24 (1925), 423-448
- (6) W S van Leeuwen, article on 'Lokalanesthetica," in *Physiologische werbestimmung von giften und giftkombinationen an warmblütern und deren organen*, In Abderhalden, *Handbuch der biologischen Arbeitsmethoden Abt IV, Teil 7, Heft 5, Lief* 98 (1923), 1065-1070
- (7) H A McGuigan, Standardization and Action of Local Anesthetics" *Jour A Ph A*, 13 (1924), 316-317
- (8) J C Munch Bioassays' (1931)
- (9) S Solis Cohen and T S Githens, Pharmacotherapeutics" (1928)
- (10) T Sollmann Comparative Activity of Local Anesthetics II Paralysis of Sensory Nerve Fibers' *J P E T*, 11 (1918), 1-7
- (11) T Sollmann 'Benzyl alcohol Its Anesthetic Efficiency for Mucous Membranes" *Ibid* 13 (1919) 355-360
- (12) T Sollman and P Hanzlik, Experimental Pharmacology" (1928) 95-100
- (13) L Zorn Beiträge zur pharmacologie der mischnarkose II Kombination der lokalanesthetica *Zeit expil Path Therap* 12 (1913) 529

## MEDICINAL COD LIVER OIL—OBSERVATIONS ON COLOR AND VISCOSITY \*

BY GEORGE E EWE

### COLOR

Medicinal cod liver oil appears in the market showing various shades of yellowish or brownish yellow color This color is to a large extent due to its content of biliary constituents of the liver from which the oil is obtained, although, as will be shown further on the source of the oil, the iron content, extent of oxidation, manufacturing manipulations, degree of exposure to sunlight, age, etc, materially affect the color of the oil The presence of biliary matters can be demonstrated by applying Pettenkofer's test to a water-extract of cod liver oil and also by applying Gmelin's test to the residue obtained by evaporating a fresh alcohol-extract of the oil

When the oil is obtained by the "steaming" process a pale colored oil is procurable whereas when the "rotting" process is employed a much darker product results While there is no data available on the relative content of biliary con-

\* Scientific Section A Ph A Madison meeting, 1933

stituents in oils made by the 2 processes the possibility is presented that the "rotting" process imparts a larger proportion of these constituents to the oil for the following reasons the "steaming" process, since it employs heat, coagulates the proteids of the liver thus locking-up the biliary constituents and rapidly segregating them from the oil whereas in the "rotting" process the liberation of the oil is dependent upon the slow disintegration (autolysis) of the liver and consequently the oil is brought into intimate and prolonged contact with the liberated biliary constituents. This should permit the oil to dissolve much more of these coloring substances than is possible with the rapid "steaming" process.

A possible source of color which has not been thoroughly recognized as yet is the iron content of the livers. Iron is a regular constituent of cod liver oil. Four samples examined by Briod, Van Winkle, Jurist and Christiansen (1) were found to contain 0.47, 0.13, 0.39 and 0.34 parts of iron per million, respectively. These proportions seem negligible, all being less than 1 part per million. However, minute proportions of iron can materially affect the color of cod liver oil as shown by the following experiments: the color of pale yellow cod liver oil to which  $2\frac{1}{2}$  parts per million of iron in the form of ferric oleate was added was distinctly darkened in color by this addition, while the addition of 5 parts per million made the oil several shades darker in color.

It does not seem inconceivable that traces of iron are carried into the oil from the iron-rich liver during the separation of the oil from the liver, especially in view of the slight acidity shown by even the best quality of cod liver oil.

While it is possible that the iron content of the livers is a source of the iron content of cod liver oil, the influence of the metallic equipment used in producing, refining, storing and shipping the oil must not be overlooked. Briod and Christiansen (2) found that darkening will be occasioned if the oil is allowed to remain in contact with iron, especially if a trace of moisture is present. Under these conditions the traces of free fatty acids common to even a good grade of oil may eventually attack the iron or iron rust of the container to produce ferrous fatty acid salts which are soluble in the oil and which later oxidize to the much darker ferric condition and so discolor the oil. Thus, the state of oxidation of the iron content is also a factor influencing the color of cod liver oil.

To ascertain something of the effects of light and oxidation and also of the possible effect of iron upon the color of cod liver oil under the influences of light and oxidation samples of plain oil, the same oil with the addition of  $2\frac{1}{2}$  parts per million of iron in the form of ferric oleate and the same oil with 5 parts per million of added iron were filed away in flint glass, corked bottles in diffused sunlight, a corresponding series being filed away in the dark. After one month all samples kept in the light were lighter than those kept in the dark whether corked or uncorked. Furthermore, there was no detectable difference in color between the corresponding corked and uncorked samples so that in the stated period of time light had exerted a notable bleaching effect but the bleaching action of oxidation was not yet evident. After 4 months all samples kept in the light were still lighter than the corresponding ones kept in the dark and, in addition, the unstoppered samples were all lighter than the corresponding stoppered ones, thus illustrating the bleaching action of oxidation. The samples exposed to both light and air were bleached to a greater extent than the corresponding ones exposed to either air

alone or light alone, so that the bleaching effects of light and air are additive. Whether the light treatment or the oxidation treatment was the more potent bleaching factor could not be satisfactorily determined in this series of experiments for although the colors of corresponding samples exposed to light alone or to air alone were approximately the same in depth, they were different in quality, the colors of the samples exposed to light alone being of a brownish cast whereas those exposed to air alone were of a yellowish cast. However, the light treatment was more rapid, since it showed its effects after 1 month, whereas the effect of oxidation was not evident at this time. The samples exposed to both light and air all showed a whitish haze after 4 months, which suggests the formation of water or other insoluble substance by the combined effect of light and air. In all cases, the colors of the samples containing  $2\frac{1}{2}$  parts of added iron per million were still distinctly (but only slightly) darker, after 4 months, than the corresponding samples of plain oil, whereas the samples containing 5 parts of added iron per million were several times darker than the samples with  $2\frac{1}{2}$  parts of added iron per million which presents the possibility that the color of cod liver oil may be darkened by iron to a greater degree than would be predictable by direct mathematical proportion.

The possibility that the color of cod liver oil may be contributed to by yellow carotinoid pigments derived from the plankton upon which cod fish feed abundantly, has evidently not been thoroughly investigated. It is known, however, that plankton feed upon diatoms and other forms of life which have been shown to contain carotinoid pigments.

The depth of color of cod liver oil will be found to vary when the oil is successively obtained from different sources, due primarily to the various manufacturing and storage methods employed by different producers. Variations in color of successive batches of the oil from a single source of production will also be occasioned if variations in the production method used in the particular plant are permitted. When uniform methods of production are used successive batches of medicinal oil of high potency and very pale color scarcely varying in depth of color can be consistently produced.

When cod liver oil is of initially dirty yellow or brown color this can be usually ascribed to unsatisfactory preparation and such oils are considered inelegant, if not actually inefficient, preparations.

When cod liver oil is exposed to air and sunlight (direct or diffused) it undergoes an initial bleaching, but if excessively exposed, ultimately becomes much darker than if protected against oxidation and sunlight. This bleaching process greatly impairs the taste and odor, and possibly the vitamin content, of the oil and consequently is not permissible in the production of the best grade of medicinal oil.

The U S Dispensatory (21st Edition) states "In the best equipped establishments (for making high quality medicinal cod liver oil) the oil is bleached by treatment with fuller's earth or by exposure to sunlight." While this may be the practice in some establishments it is certain that the use of fuller's earth or exposure to sunlight is entirely unnecessary for the production of pale colored medicinal cod liver oil of extreme palatability, unoffensive odor and high vitamin A and D potency. Oils produced without these treatments are to be pre-

ferred since the effect of these treatments upon the taste, odor and possibly the vitamin content, is not favorable

High quality, pale colored medicinal oil has been observed to darken slightly when kept in tightly stoppered, incompletely filled, flint-glass bottles for some months in diffused sunlight, and even when kept in the dark. In the latter case, even amber-glass bottles did not entirely prevent a change in color. However, in all these cases, the color, while unmistakably darker, was no darker than that of many oils ordinarily marketed as medicinal oils and the oils were still entirely fit for use.

J. C. Drummond (3) states that the nearly colorless cod liver oils derived from spawning fish are considerably lower in vitamin content than the pale yellow oils obtained from feeding fish. Drummond goes on to state that it is not at all undesirable that medicinal cod liver oil should possess a pale lemon color since such oils are generally superior to so called "white" oils, and that only dirty yellow or brown oils, are undesirable, since these colors usually indicate unsatisfactory preparation.

There is no direct relation between the depth of color of a medicinal cod liver oil and its vitamin content and biological assay, rather than color, must be depended upon as the criterion of vitamin potency. Hare ("Practical Therapeutics," 1930) states "The oil is pale or dark according to its freedom from foreign materials. Although the paler oils are generally prescribed, there can be little doubt that the darker ones are more medicinally active." However, since pale oil has been repeatedly observed to darken with age while the vitamin content has certainly not coincidentally increased, Hare's statement cannot be concurred in. It is also well known that oil prepared by the "rotting" process while highly colored is not higher on the average in vitamin content than the light colored oils obtained by the "steaming" process.

Pale yellow color as a result of careful preparation, storage and preservation is a desirable feature of medicinal oil since the pale yellow oil is generally considered the more elegant product. However, pleasant taste and odor and high vitamin potency must also be possessed by such a product and products made pale by chemical, adsorbent or light treatments at the expense of taste, odor or potency must be guarded against. An oil possessing some color but of satisfactory taste, odor and vitamin potency is more to be desired than a pale oil of poor taste and odor and low vitamin potency, or a "white" oil of low potency.

#### VISCOSITY

The viscosity (or consistency) of cod liver oil calls for important consideration because a more viscous oil would be less readily swallowed.

At least one producer of medicinal grades of cod liver oil assures prospective users that his product is uniform in consistency. However, in this investigation no material difference was found in the viscosities of various market brands of medicinal cod liver oil when compared at 25° C.

To the eye, different brands of cod liver oil of the same grade will often appear to vary in viscosity when compared, but a more reliable measure of viscosity must be used to obtain a true comparison. The U. S. P. IX method for determining

the viscosity of Liquid Petrolatum affords a simple and sufficiently accurate way of comparing the viscosities of various cod liver oils of the same grade

Various brands of medicinal cod liver oils on the market showed the following viscosities by the U S P IX method for Liquid Petrolatum 5 74, 5 77, 5 39, 5 45, 5 45, 5 61, 5 80, 5 64 and 5 80, respectively Some of these oils were flavored but it is not likely that the viscosities of the original unflavored oils were materially different since the addition of 0 5% of essential oil to cod liver oil of known viscosity had no appreciable effect upon the viscosity While the above data shows some variation in the viscosity of different market brands the differences are not material since several persons were unable to distinguish any difference in viscosity upon swallowing comparative doses of the above oils showing maximum (5 80) and minimum (5 32) viscosities

Successive batches of medicinal cod liver oil from a single source of manufacture appear to vary in viscosity among themselves to an even lesser degree than do market brands from various sources Ten successive batches from a single source of manufacture showed viscosities of 5 55, 5 58, 5 64, 5 67, 5 58, 5 80, 5 64, 5 70, 5 80 and 5 61, respectively

Oxidation is a well-known factor operating to increase the viscosity of cod liver oil It is a familiar fact that when cod liver oil is exposed to the air it becomes progressively more viscous and finally forms a tacky, gelatinous mass Three lots of cod liver oil of known viscosity by the U S P IX viscosity test for Liquid Petrolatum, showed definitely increased viscosities, when tested 3 months later, after having been stored in screw-capped bottles, the bottles being uncapped occasionally to simulate the treatment they would likely undergo as bulk stock containers in the retail pharmacy (see "Treatment No 1" in table) When these oils were stored for 3 months in wide-mouthed bottles, the mouth of each bottle being covered with muslin, to illustrate the effect of exaggerated exposure to the air, the resultant respective viscosities of the 3 oils were much more greatly increased (see "Treatment No 2" in table) In the latter series, surface oxidation was plainly visible (surface film and shred formation) and the taste of the oils seriously impaired The U S P reminder to preserve cod liver oil in well-closed containers is pertinent and displacement of the air in the container by an inert gas is of additional precautionary value

TABLE SHOWING EFFECT OF SPONTANEOUS OXIDATION UPON THE VISCOSITY OF COD LIVER OIL

Oil No	Initial Viscosity	Viscosity after Treatment No 1	Viscosity after Treatment No 2
1	5 64	5 90	7 03
2	5 61	5 78	7 12
3	5 67	5 74	6 23

As pointed out by the writer in JOUR A PH A, 22 (1933), 109-112, stearin content ordinarily found in market brands of medicinal cod liver oil has no appreciable effect upon the viscosity of the oils at room temperature, although at much lower temperatures and especially around congealing temperatures the proportion of stearin very greatly affects the viscosity, the viscosity being increased by increase in the stearin content

The viscosity of cod liver oil is very materially influenced by the temperature, high temperatures reducing the viscosity and low temperatures greatly increasing it



As also pointed out by the writer in the above-mentioned article in *JOUR A PH A*, 22 (1933), 109-112, medicinal cod liver oil is often thickened or congealed by precipitation of stearin at temperatures of about minus 8° C or lower and even at refrigerator temperature (10° C) its viscosity is greatly increased (from 5.6 to 8.1, on the average) "As a consequence, when it is desired to minimize the influence of viscosity upon the taking of cod liver oil it is well to direct that the dose be taken from a small bottle of the oil kept at room temperature, the main supply being preserved in the refrigerator or other cool place "

## REFERENCES

- (1) A E Briod, R Van Winkle, A E Jurist and W G Christiansen, *JOUR A PH A*, 18 (1929), 771-778
- (2) A E Briod and W G Christiansen, *Ibid*, 19 (1930), 1308-1309
- (3) J C Drummond, *Lancet*, 209 (1925), 679 through *YEAR BOOK, A PH A* (1925) 236-237

## BIBLIOGRAPHY

- H Steenbock, M Sell and M V Buel *J Biol Chem* (June 1921), 89  
P R Peacock, *Austral J Pharm* through *Merck's Report*, 37 (1923) 19

RESEARCH LABORATORIES  
FAIRBY NASON COMPANY BOSTON MASS

---

## COD LIVER OIL—STABILITY OF VITAMIN A CONTENT UNDER CONDITIONS OF COMMERCIAL DISTRIBUTION \*

BY GEORGE E ÉWE

The value of cod liver oil resides in its vitamin content. Consequently, consideration of the degree of stability of the vitamin content of cod liver oil is of importance. The following data concern the stability of the vitamin A content of cod liver oil, consideration of the vitamin D content being reserved for a possible future communication. Poulsson (1) found that a sample of cod liver oil, 23 years old, promoted growth in rats kept on a deficient diet when fed with 3 to 5 mg daily of the oil. Evers (2) reported that cod liver oil, when properly stored, retains a considerable proportion of its vitamin A activity for long periods (up to 26 years), and that exposure to light or oxidation lowers its vitamin A activity, the chief cause of loss of activity being the action of light. Sunlight, especially, was found by Evers to destroy vitamin A rapidly and in this respect it appeared to be more active than ultraviolet radiation from a mercury vapor lamp. He suggested that the oil be preserved in amber bottles with as little exposure to the air as possible. Holmes and Pigott (3) found that exposure of cod liver oil in flint-glass bottles to direct sunlight transmitted through ordinary glass windows as much as possible during 16-24 months resulted in marked loss of potency. Exposure to diffused sunlight during 14-26 months showed no detectable detrimental effect except in an excessively warm location. The experiments were controlled by parallel samples enclosed in cartons to shut off the light. Holmes and Pigott concluded that light-proof containers, such as amber bottles or flint bottles wrapped in paper or cartons should be used in storing and distributing cod liver oil.

---

\* Scientific Section A PH A Madison meeting, 1933

As a contribution to the subject of the stability of the vitamin A content of cod liver oil a study was made regarding the possible effects of the varying conditions and vicissitudes to which cod liver oil is subjected under conditions of commercial distribution. To do this, bottles of cod liver oil which had been out in the trade for various periods of time and which were returned for credit (almost invariably because of labels soiled through handling) were taken at random and the oil re-assayed for vitamin A and the assay compared with the original assay of the oil. The oils involved were of medicinal grade from the Lofoten area of Norway and conformed with the characteristics and tests outlined in a previous article by the writer (JOUR A PH A, 21 (1932), 1145). The oils were contained in either 4-oz or 12-oz greenish flint, screw-capped glass bottles without wrapping or carton around the individual bottle, the filled bottles being packed in cartons of 6 bottles each, in the case of the 12-oz size bottles, or in cartons of 12 bottles each in the case of the 4-oz size bottles. The oils were marketed through the usual wholesaler-retailer route. Presumably, the retailer orders from a twelfth of a dozen up, as required, and the wholesaler removes the bottles of oil from the cartons, as necessary to supply the ordered quantity and then forwards the bottles of oil to the retailer.

Practically nothing is known of the varying conditions and vicissitudes to which the bottled oils had been subjected out in the trade. However, none of the bottles had been opened since they were sealed at the factory. The bottles of oil had been subjected to all of the actual, normal conditions of trade and not to any artificial set of conditions in any particular. Consequently, the results should fairly indicate the stability of the vitamin A content of bottled cod liver oil under the ordinary conditions of the handling undergone by these oils during commercial distribution.

TABLE SHOWING STABILITY OF VITAMIN A CONTENT OF COD LIVER OIL UNDER CONDITIONS OF COMMERCIAL DISTRIBUTION

Batch.	Vitamin A Content when Originally Bottled	Vitamin A Content after Exposure to Trade Conditions	Length of Time Exposed to Trade Conditions
18591	Not less than 1000 units	Not less than 1000 units	3 years 11 months
18764	Close to 1000 units	Close to 800 units	4 years
19132	Not less than 1000 units	Not less than 1000 units	3 years, 11 months
19200	Between 800 and 1000 units	Between 800 and 1000 units	3 years, 8 months
19352	Not less than 1000 units	Not less than 1000 units	3 years, 9 months
19400	Not less than 1000 units	Not less than 1000 units	3 years, 9 months
19800	Between 800 and 1000 units	Between 800 and 1000 units	3 years, 4 months
20125A	Not less than 1000 units	Not less than 1000 units	2 years, 8 months

The above results indicate that it is very unlikely that bottled medicinal cod liver oil will deteriorate in respect to its vitamin A content before reaching the hands of the consumer. Nevertheless, good pharmaceutical practice dictates that protection from the direct rays of the sun and from excessive exposure to the air or storage in warm locations should not be denied this product.

#### REFERENCES

- (1) E Poulsson *Biochem J*, 18 (1924), 919-920
- (2) Norman Evers *Quart J Pharm Pharmacol*, 22 (1929) 556-565
- (3) Holmes and Pigott *Boston Med Surg J* 195, 263-265

RESEARCH LABORATORIES TAILBY-NASON COMPANY BOSTON MASS

## TINCTURE OF DIGITALIS \*

BY L W ROWE AND WILBUR L SCOVILLE

This paper is a continuation of the work reported to this Section two years ago. In November 1931, a second series of tinctures was prepared from a defatted drug assaying 200 per cent of standard.

For Series A, 125 Gm of the drug was extracted with 77% alcohol and 1150 cc of tincture was obtained, this being 92% of the full yield. This percolate was then divided into five portions of 230 cc each and numbered successively.

No 1 was diluted to 250 cc with 77% alcohol.

No 2 was adjusted to a  $p_H$  of 2.93 by the addition of 1.5 cc of hydrochloric acid, then made up to a volume of 250 cc by the addition of 2.5 cc of water and 16 cc of alcohol.

No 3, which had an initial  $p_H$  of 5.56, was adjusted to a  $p_H$  of 6.76 by the addition of sodium hydroxide solution, then made up to a volume of 250 cc with 77% alcohol.

To No 4 was added 2.5 cc of glacial acetic acid, then 15 Gm of anhydrous sodium acetate was dissolved in the liquid and the final volume was adjusted to 250 cc by addition of alcohol.

No 5 was treated with 50 Gm of anhydrous sodium sulphate, the mixture being agitated frequently during one week, then filtered and the filter washed with 95% alcohol to obtain a yield of 250 cc. This assayed 78.6% of alcohol and showed a  $p_H$  of 5.41.

Series B was made from another 125 Gm of the same drug but it was first sterilized in the following manner. The drug was mixed with 120 cc of 95% alcohol, allowed to stand over night, then heated on a steam-bath under a reflux condenser for 20 minutes, cooled, 30 cc of water added and well mixed, then transferred to a percolator and extracted with 77% alcohol to obtain 1150 cc of percolate.

This was divided into five equal portions and the series made to correspond to Series A, No 1 being diluted to 250 cc with menstruum, No 2 adjusted to a  $p_H$  of 3.01 with hydrochloric acid, No 3 adjusted to a  $p_H$  of 6.70 with sodium hydroxide, No 4 saturated with anhydrous sodium acetate (15 Gm) and 2.5 cc glacial acetic acid added to maintain an acid reaction, and No 5 partially dehydrated with 50 Gm of anhydrous sodium sulphate. The alcohol in No 5 when finished tested 79.9%. Each was adjusted to a final volume of 250 cc.

Series C was made with 87% alcohol, without sterilization, the 1150 cc of percolate being divided into five portions of 230 cc each. No 1 was diluted to 250 cc by addition of 87% alcohol, No 2 was adjusted to a  $p_H$  of 2.80 with hydrochloric acid, No 3 to  $p_H$  6.80 with sodium hydroxide, No 4 was saturated with (10 Gm of) anhydrous sodium acetate and kept acid by means of 2 cc of glacial acetic acid, and No 5 was treated with 30 Gm of anhydrous sodium sulphate. This showed an alcohol content of 87.2% when finished.

All samples were adjusted to a final volume of 250 cc, were assayed soon after completion, then all were stored in amber bottles in a laboratory room and in diffused light.

\* Scientific Section A. P. H. A. Madison meeting 1933.

The second assay was made 11 months after the first

The following table shows the stability of the samples during an eleven months' period

Series A	$p_H$	First Assay	Second Assay	Series B	$p_H$	First Assay	Second Assay	Series C	$p_H$	First Assay	Second Assay
No 1	5 38	110%	85%	No 1	5 37	110%	90%	No 1	5 16	100%	90%
No 2	2 93	110	120	No 2	3 01	110	110	No 2	2 80	110	65
No 3	6 76	100	90	No 3	6 70	110	110	No 3	6 80	150	85
No 4	6 10	110	120	No 4	6 07	100	120	No 4	6 25	150	90
No 5	5 41	110	150	No 5		110	70	No 5		100	80

Two lots of tincture made with 77% alcohol and stabilized with anhydrous sodium acetate and acetic acid in 1930 were again assayed with the following results

Tinct G	125% on Dec 1 1930	125% on May 28, 1931,	120% in November 1932
Tinct F	125% on Dec 1 1930	125% on May 28, 1931	120% in November 1932

One of us (L W R) has also tested the toxicity of anhydrous sodium acetate on frogs and white mice, and reports as follows

"The solution used contained 6% of anhydrous sodium acetate in 70% alcohol and also 1% of acetic acid By the one-hour frog method 0 015 cc per Gm was necessary to prostrate the frog, while 0 025 cc per Gm did not stop the heart in systole The minimum systolic dose for Tr Digitalis, U S P X is 0 006 cc per Gm so that more than four times as much of the control solution failed to show any digitalis action The minimum lethal dose for frogs is about 0 050 cc per Gm and then the heart stops in diastole The solution was more toxic to white mice as a dose of 0 010 cc per Gm was just fatal

"It could not be denied that this control solution possessed some toxicity for these small laboratory animals, the white mouse and the frog, but the toxic action was not at all like that of the digitalis glucosides, so it really should not affect the assay appreciably "

These results may be summarized as follows The plain, unadjusted tincture shows a 15% deterioration in eleven months, from sterilized drug a 10% deterioration, and when made with 87% alcohol 10% deterioration in the same time

When adjusted to a  $p_H$  of about 3 0 with hydrochloric acid, no deterioration is shown in the two tinctures made with 77% alcohol, but 40% deterioration appears in that made with 87% alcohol

When adjusted to near neutrality by addition of sodium hydroxide a deterioration of 10% is shown in the first tincture, no deterioration in that made from sterilized drug and 45% deterioration in that made with 87% alcohol In the latter case the tincture was on the alkaline side for a few moments during the adjustment proceedings

In the tinctures saturated with anhydrous sodium acetate, the first shows no deterioration, the sterilized drug shows no deterioration and that made with 87% alcohol shows 40% deterioration The reports on the first two each show a variation of 10 points—which suggests an experimental error The last tincture is outside the pale of experimental error

The treatment with anhydrous sodium sulphate for the purpose of dehydrating shows peculiar results. The first tincture indicates a gain of 36%, the second a loss of 37% and the third a loss of 20%. Furthermore the dried sodium sulphate proved to be a weak dehydrating agent in the tinctures as shown by the fact that the finished tinctures in each case contained about the same percentage of alcohol as the menstruum used. On the basis of the above results this method does not look promising.

Reviewing the results of three years' experiments the anhydrous sodium acetate treatment is the only one which has shown real and fairly consistent stability. In the (only) two samples made in 1930 the tinctures have remained practically stable for two years.

Adjustment of the  $pH$  shows no advantage and other laboratories have concurred in that view. The use of a stronger alcoholic menstruum involves greater difficulty in extraction, and thus far does not indicate any greater stability in the tincture.

Sterilizing the drug before extracting has indicated some advantage in certain trials, none in others. The advantages are not great enough and the results are not consistent enough to warrant a positive opinion on this method.

The sodium acetate treatment is the only method found which has shown positive and fairly consistent stabilizing results.

It must be borne in mind that the only problem is to secure a stable tincture. We have had no difficulty for thirty years in making tinctures which represent the drug satisfactorily, when first made, but these tinctures are unstable.

The amount of anhydrous sodium acetate needed is 60 Gm in 1000 cc. This is equivalent to a little more than 99 Gm of the U S P sodium acetate containing three molecules of water.

That will equal about 1.5 grains of the official salt in 15 minims of Tincture of Digitalis. The average dose of sodium acetate is given as 25 grains. It has a diuretic action, this being in harmony with digitalis action. It is not a very active or toxic salt. It does not seem likely that it will interfere with or modify the action of the tincture in any quantity which may be given.

The tests on toxicity, which are reported above, were made with the anhydrous salt.

The following formula is offered as a definite subject for consideration.

#### TINCTURA DIGITALIS

Tincture of Digitalis

Tr. Digit	Digitalis tinctura P. I
DIGITALIS, in fine powder	100 Gm
GLACIAL ACETIC ACID	10 cc
ANHYDROUS SODIUM ACETATE	60 Gm
<hr/>	
To make about	1000 cc

Pack the digitalis firmly in a cylindrical glass percolator provided with a stop-cock and arranged with a cover and receptacle suitable for volatile liquids, and percolate slowly with purified petroleum benzine until a few drops of the last percolate evaporated from paper leave no greasy stain. Reject the benzine percolate.

Remove the drug from the percolator and expose it to air until dry and the odor of benzoin is no longer noticeable. Extract this defatted drug by percolation, using a mixture of 4 volumes of alcohol and 1 volume of water as the menstruum, after macerating three days and then percolating slowly. Collect 920 cc of percolate, add to this the glacial acetic acid and then dissolve the anhydrous sodium acetate in the mixture. Assay a portion of this liquid and dilute the remainder with sufficient of a solution composed of 80 cc of alcohol, 20 cc of water, 1 cc of glacial acetic acid and 6 Gm of anhydrous sodium acetate to conform to the above biological standard.

RESEARCH LABORATORIES OF PARKE DAVIS & Co.,  
DETROIT MICH

## THE GERMICIDAL ACTION OF 2-CHLORO-4-*n*-ALKYLPHENOLS \*

BY F F BLICKE AND R P G STOCKHAUS <sup>1 2</sup>

During the last few years a considerable number of new phenolic germicides have been introduced as therapeutic agents—compounds in which the antiseptic value of the phenolic nucleus has been augmented by the introduction of nuclear halogen or alkyl groups or by both types of substituents, for example, hexylresorcinol, *n*-amyl-*m*-cresol, chlorothymol and chlorocarcinol.

It seemed to us that a very effective manner in which the germicidal power of phenol itself could be increased would be through the introduction of halogen and a long, straight side chain. Consequently, a homologous series of 2-chloro 4 *n*

TABLE I—2 CHLORO 4 *n*-ALKYLPHENOLS AND CORRESPONDING  $\alpha$  NAPHTHOATES

Alkyl Group	B P ° C	Phenols Formulas	Analyses Calc d	% Cl Found	$\alpha$ Naphthoates <sup>b</sup> M P ° C	Analyses Calc d	% Cl Found
Methyl <sup>a</sup>	197-198 738 mm	C <sub>7</sub> H <sub>7</sub> OCI	24 88	25 14	108-110	11 95	12 03
Ethyl	216-217 742 mm	C <sub>8</sub> H <sub>9</sub> OCI	22 64	22 51	70-72	11 41	11 44
Propyl	226-227 741 mm	C <sub>9</sub> H <sub>11</sub> OCI	20 78	20 34	71-73	10 92	10 78
Butyl	243-244 735 mm	C <sub>10</sub> H <sub>13</sub> OCI	19 21	18 87	44-46	10 47	10 28
Amyl	259-260 740 mm	C <sub>11</sub> H <sub>15</sub> OCI	17 85	17 38	63-65	10 05	10 03
Hexyl	275-276 740 mm	C <sub>12</sub> H <sub>17</sub> OCI	16 67	16 00	43-45	9 67	9 71
Heptyl	290-291 738 mm	C <sub>13</sub> H <sub>19</sub> OCI	15 64	15 53	45-47	9 31	9 12

<sup>a</sup> This compound was first prepared by Schall and Dralle (*Ber* 17 (1884) 2528, and then by Zincke (*Ann*, 328 (1903), 277). The last mentioned investigator recorded the boiling point as 194-196°.

<sup>b</sup> The  $\alpha$  naphthoate of *p*-cresol melts at 61-63°, the diphenyl-*p*-carboxylate at 122-124°. The benzoate of 2-chloro 4-methylphenol melts at 67-68°, the *p*-nitrobenzoate at 88-90°, the diphenyl-*p*-carboxylate at 111-113°. The benzoate of 2-chloro 4-ethylphenol melts at 44-46°.

All of the naphthoates listed in the above table were recrystallized from absolute alcohol. Other esters which were found to be too soluble in alcohol were recrystallized from petroleum ether (30-60°). In a few instances the crude naphthoates were somewhat oily, hence they were cooled with ice and thoroughly triturated several times with small amounts of absolute alcohol prior to recrystallization.

\* Scientific Section A PH A Madison meeting 1933

<sup>1</sup> This paper represents the first part of a dissertation to be submitted to the Graduate School by Mr. Stockhaus in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the University of Michigan.

Mr. Stockhaus is the present Frederick Stearns and Company Fellow.

<sup>2</sup> College of Pharmacy University of Michigan Ann Arbor Michigan

alkylphenols was prepared and it was found that the phenol coefficients of the compounds increased progressively from the methyl- to the heptylphenol, inclusive. The highest members of the series, the hexyl- and heptylchlorophenols, possess unusually high phenol coefficients.

Special emphasis was placed on the preparation of very pure samples for bacteriological tests. The chlorophenols which we prepared are oils and, consequently, it is almost impossible to purify small quantities of them by distillation. We purified each phenol in the following manner: fractionation of the crude product, conversion of a fraction which boiled over not more than one degree range into the crystalline  $\alpha$ -naphthoate, careful purification of the latter by recrystallization, hydrolysis of the naphthoate, distillation of the recovered phenol. The purity of the material used for bacteriological tests was established by analysis (Table I).

The chloroalkylphenols were prepared in four stages according to the following general method: (a) preparation of the phenyl ester from the aliphatic acid chloride and phenol, (b) rearrangement of the ester by means of aluminum chloride into the 4-hydroxyphenylalkyl ketone, (c) reduction of the ketone to the 4-alkylphenol, (d) chlorination of the latter with sulphuryl chloride.

The lower members of the series are characterized by a strong cresol-like odor while the higher members are practically odorless.

#### EXPERIMENTAL PART

The phenyl esters were prepared in the following manner. Equivalent amounts of phenol and the required acid chloride were heated at  $140^{\circ}$  for three hours. The esters were washed with sodium hydroxide solution and then purified by distillation. The yields varied from 75-86%. The boiling points of compounds not described hitherto are as follows: phenyl valerate,  $116-120^{\circ}$  (16 mm), phenyl caproate,  $134-136^{\circ}$  (19 mm),  $255-257^{\circ}$  (738 mm), phenyl heptanoate,  $155-157^{\circ}$  (23 mm).

Rearrangement of the esters to the 4-hydroxyphenylalkyl ketones was effected as follows. To one mole of the phenyl ester, dissolved in 400 cc of nitrobenzene, there was added 1.5 moles of aluminum chloride. After four days the mixture was poured on ice and, after removal of the nitrobenzene by steam distillation, the ketone was purified by distillation under reduced pressure and then by recrystallization from benzene or xylene. The yields of pure products varied from 50-60%. The physical constants found agreed with those published in the literature.

In order to obtain the 4-*n*-alkylphenols a mixture prepared from one mole of the ketone, 1250 Gm of amalgamated zinc, 750 cc of water and 750 cc of hydrochloric acid, was refluxed for four to seven days. During the course of each day an additional 100 cc of hydrochloric acid was added. The boiling points found for the alkylphenols were practically the same as those recorded in the literature. The yields varied from 50-75%.

Finally, the 2-chloro-4-*n*-alkylphenols were obtained by the following general process. The alkylphenol was mixed with 1.1 molecular equivalents of sulphuryl chloride and after five days the product was washed free from halogen compounds with sodium carbonate solution and then purified by distillation. The distilled material was converted into the  $\alpha$ -naphthoate in the following manner. Equi-

molecular amounts of the phenol and  $\alpha$ -naphthoyl chloride were mixed and shaken vigorously while one molecular equivalent of pyridine was added slowly. After several hours the solid reaction mixture was triturated with ice water which contained one equivalent of hydrochloric acid. The solid product was filtered, washed with sodium carbonate solution, dried and recrystallized from alcohol. The ester was then hydrolyzed with one molecular equivalent of sodium hydroxide in 75% alcohol, the alcohol removed and the mixture neutralized with hydrochloric acid. After the addition of excess sodium carbonate the material was subjected to steam distillation. The phenol was extracted from the distillate with ether and purified by distillation.

The phenol coefficients (Table II, Column 1) were determined by Dr W L Mallmann and carefully checked at a later date. 2-Chloro-4-*n*-heptylphenol was tested, independently, by Dr C W Geiter who, likewise, found that this compound possesses the relatively high phenol coefficient of 666. Bacteriological data on 2-chloro-4-*n*-alkylphenols have been presented recently by Klarmann, Shternov and Gates (1), their results are reproduced in Table II, Column 2. Striking discrepancies between the values in Columns 1 and 2 are to be noticed in connection with the hexyl- and heptylphenols.

TABLE II.—PHENOL COEFFICIENTS

(Reddish Method)

Phenol	Test Organism <i>Staph. aureus</i> (37° C)	
	1	2
2 Chloro 4-methyl	9	7.5
2 Chloro-4-ethyl	18	15.7
2 Chloro-4- <i>n</i> propyl	31	32.1
2 Chloro 4- <i>n</i> butyl	115	93.8
2 Chloro 4- <i>n</i> -amyl	333	286.0
2 Chloro 4- <i>n</i> hexyl	444	714.0
2 Chloro-4- <i>n</i> heptyl	666	375.0
2 Chloro-4-tert amyl <sup>a</sup>	150	125.0
4- <i>n</i> Capronyl <sup>b</sup>	40	
2-Chloro-4- <i>n</i> capronyl <sup>c</sup>	40	
2,6 Dichloro-4- <i>n</i> hexyl <sup>d</sup>	50 <sup>e</sup>	

<sup>a</sup> B p 247–248° <sup>b</sup> M p 61–62° after recrystallization from absolute alcohol <sup>c</sup> M p 79–81° after recrystallization from absolute alcohol, Anal calcd for C<sub>12</sub>H<sub>16</sub>O<sub>2</sub>Cl Cl, 15.65 Found Cl, 15.50 <sup>d</sup> B p 308–310° under 745 mm pressure, Anal calcd for C<sub>12</sub>H<sub>16</sub>OCl<sub>2</sub> Cl 28.70 Found Cl, 28.90 <sup>e</sup> This value was obtained by Dr Geiter

## SUMMARY AND CONCLUSIONS

A homologous series of 2-chloro-4-*n*-alkylphenols has been prepared in which the alkyl groups range from methyl to heptyl, inclusive.

The phenol coefficients of highly purified samples of these compounds increased progressively from the methyl- to the heptylphenol and for the latter substance the relatively high value of 666 was obtained.

## REFERENCE

(1) Emil Klarmann V A Shternov and L W Gates *J Am Chem Soc* 55 (1933), 2580. Except for a few confirmatory bacteriological tests our investigation had been completed about six months prior to the publication of the article by Klarmann and coworkers.



SOME FACTS CONCERNING THE PHARMACOLOGICAL AND  
PHYSIOLOGICAL ACTION OF ACETANILID \*

BY SAMUEL T. HELMS, M.D.

The object of this paper is to present, without elaboration at this time, some facts obtained by animal and clinical experimental work concerning the action of acetanilid.

For years opinions concerning the action of this drug have obtained which pharmacological and clinical evidence prove to be erroneous.

Many errors in the literature appear to be there for the reason that no one has taken the trouble to disprove them, so they remain and grow and pass from year to year, from book to book.

The following topics are considered of sufficient importance to be included:

- (1) The toxic dose when the drug is given by mouth
- (2) The minimum lethal dose
- (3) The effect of continuous ingestion
- (4) The effect upon the circulatory system
- (5) The effect of continuous use as determined by clinical experimental work
- (6) Occurrence of untoward effects as shown by hospital records
- (7) Acetanilid and cyanosis

## THE TOXIC DOSE

In this investigation, all the usual laboratory animals have been used, and the doses were given in terms of milligrams per kilogram, so that each milligram corresponds to one grain for an average sized adult.

Briefly, the manifestations of toxic action become evident in the following order and character:

100 mg per Kg cause no evidence of toxic action

200 mg per Kg cause dogs to salivate some but cause no signs in other animals

400 mg per Kg produce marked salivation in dogs, with restlessness. In rabbits, the toxic action is shown by weakness in the hind legs but the animals move about and eat. Rats become moderately depressed but come to the cage door for food. All animals completely recover by the next day.

800 mg per Kg cause marked increase in all of the above signs and in addition dogs and rats develop dyspnea. All recover.

1000 mg per Kg have repeatedly failed to produce fatal results.

## THE MINIMUM LETHAL DOSE

The M. L. D. for guinea pigs and for rabbits is 1500 mg per Kg.

For rats it is 2400 mg per Kg given by stomach tube in 50% alcohol.

Dogs have not been given more than 1000 mg per Kg due to the large amount of fluid required to wash the drug into the stomach. This much is not fatal to the dog.

Mice survive up to 1350 mg per Kg given hypodermically.

## THE EFFECT OF CONTINUOUS INGESTION

*Mice*—Although the M. L. D. for mice, when injected hypodermically, is 1350 mg per Kg, mice take half this amount daily in drinking water, with no

---

\* Scientific Section A. P. H. A., Madison meeting 1933

effect upon them except a delay in growth, which is recovered from when the acetanilid is withdrawn

These animals taking 500 mg per Kg per day for a month, triple their weight. They take 325 mg per Kg plus 60 mg per Kg of caffeine for a month, with no deleterious effect

(Personal communication from Dr H A McGugan University of Illinois, Department of Pharmacology Extract of this work appeared in the July issue of the *Journal of Pharmacology and Experimental Therapeutics* )

*Rats*—Rats given 5 to 10 mg per Kg per day in milk, through four generations, reproduce in normal numbers, develop normally, care for their young and show no deviation in morbidity or mortality from the average for an unmedicated rat population

Rats given 250 mg per Kg in 50% alcohol daily for two weeks, show no anemia in daily blood pictures and examination of the bone marrow at the end of this time shows it to be normal

*Rabbits*—Rabbits given 10 mg per Kg twice daily for 3 months, and the same amount four times daily for a second 3 months, gain 200–400 Gm and monthly examinations of blood and urine disclose no pathological findings in either

*Dogs*—Two dogs carried for three months on four grains twice daily, have grown normally, and maintained normal appetites and good general condition. One had pups, and received the drug through gestation and lactation. All pups lived and reached maturity

Two dogs receiving five grains each, twice daily, for a year, progressed normally, the blood and urine remained normal, as shown by monthly examinations, and no spectroscopic changes developed in the blood

Autopsy of the animals at the end of this period, with histological examination of cardiac muscle, liver, spleen, kidneys, brain and cord, has shown no pathological changes

#### THE EFFECT UPON THE CIRCULATORY SYSTEM

When acetanilid, in fatal amounts, is injected intravenously, animals do not die a cardiac death, but a respiratory death

A large number of myocardiographic tracings have been made upon dogs under Nembutal anesthesia that bear this out

A dog was given two grains by stomach tube every half hour for 12 doses, and another was given four, and another 12 at like intervals, and no changes were produced in the tracing

One-drachm doses were given by mouth, with no significant changes occurring

One drachm introduced directly into an intestinal loop, through an enterostomy, caused no depression of the circulation, when observed over a whole day

Although conclusions should not be drawn from intravenous injections, this was also done. 100 mg per Kg as a 0.5% solution in sodium chloride was infused, at hourly intervals for a whole working day, with no evidence of depression

Alcohol—20 cc of 35% solution—intravenously, produced depression quickly recovered from. Repetition of this dose twice was fatal

Ten cc of mucilage of acacia intravenously produced a change in the tracing,

identical with that caused by 10 cc of the same solution to which had been added 5% acetanilid

#### THE EFFECT OF CONTINUOUS USE AS DETERMINED BY CLINICAL EXPERIMENTAL WORK

Ten individuals were given 4 grains of acetanilid at 9 00-9 30 and 10 00 A M daily, for a period of 16 weeks and were subjected to weekly examinations with the following findings

- (1) No changes in physical examination as shown by weekly check ups
- (2) No effect on nervous system as evidenced by expert neurological examination
- (3) No effect on heart muscle or conducting mechanism as evidenced by weekly electrocardiograms by well sustained blood pressure and physical examination of the heart
- (4) No effect on metabolism as shown by B M R
- (5) No methemoglobin formation or other spectroscopic changes as shown by spectroscopic examination of the blood
- (6) No effect on kidneys as shown by kidney function, tests and urinalyses
- (7) No changes in blood chemistry findings
- (8) No blood destruction as evidenced by the fragility, the Van den Bergh test and icteric index
- (9) A transitory effect upon hemopoiesis as shown by initial slight changes in red cell counts which soon return to normal and are found normal at the conclusion of the test

#### OCCURRENCE OF UNTOWARD EFFECTS AS SHOWN BY HOSPITAL RECORDS

Statistical data were secured by mailing questionnaires to all of the hospitals and institutions in the United States Replies were received, which represented 2,500,000 hospital admissions annually for 10 years, or a total of 25,000,000 people

Total poisonings in the records of these institutions were 5.6 per million and deaths 0.16 per million

Similar figures concerning the barbituric acid derivatives for poisonings were ten times that of acetanilid and for deaths were nine times as large

The significance of these figures is in the way these drugs are used The frequency of the use of acetanilid, in various preparations, far exceeds that of the hypnotic group The acetanilid group is used largely by the laity for self medication, while the use of the hypnotic group is to a larger extent in the hands of physicians

In this connection an interesting observation is made in the Prescription Ingredient Survey The use, by prescription of acetanilid and phenacetin has decreased, the former markedly, the latter less so, while the use of the hypnotic compounds has increased to such extent that they occur more than once in every ten prescriptions or about 28,700,000 times a year

#### ACETANILID AND CYANOSIS

It is now apparent that the cyanosis seen in rare instances in connection with the alleged use of acetanilid is not dependent upon the use of drugs The condition is always associated with constipation, and is only relieved when the constipation is relieved The cause lies in an abnormality within the individual himself A study of the fifty cases of this condition reported in the literature discloses that the taking of drugs was ruled out in thirty-six

The abnormal hemoglobin derivative developed is not methemoglobin but is sulphurhemoglobin. This compound is formed by the action of hydrogen sulphide on the blood, and as acetanilid contains no sulphur it cannot be the cause of the condition.

#### CONCLUSIONS

- 1 The toxic dose of acetanilid is about 100 times the therapeutic dose
- 2 The M. L. D. in general agrees for all laboratory animals and is around 1500 mg per Kg or 500 times the therapeutic dose
- 3 Continuous ingestion of large amounts has no deleterious effects upon animals
- 4 Acetanilid is not a circulatory depressant
- 5 Twelve grains a day for 16 weeks has no deleterious effect upon human subjects
- 6 In the hospital records of the United States, cases of poisoning and deaths from the drug are of insignificant number
- 7 In the hands of the Medical Profession, the use of these analgesic drugs has largely been replaced by the use of intellectually depressant, or sleep-producing, drugs
- 8 The cyanosis seen at times in connection with the use of these drugs is not dependent upon drug action, but upon an individual predisposition of the user

EMERSON TOWER BUILDING  
BALTIMORE MD

---

### THE CHEMICAL AND PHARMACOLOGICAL PROPERTIES OF CALCIUM ACETYSALICYLATE \*<sup>1</sup>

BY H E THOMPSON AND C A DRAGSTEDT

(From the Department of Physiology and Pharmacology, Northwestern University Medical School, Chicago )

During the past year, we have had an opportunity to examine several powder and tablet preparations of calcium acetylsalicylate. Inasmuch as this substance is marketed abroad while little information concerning it is available in American literature, we thought it worth while to record our observations with respect to its chemical, physical and pharmacological properties.

The following preparations were available for testing:

- 1 Kalmopyrin Tablets and powder of calcium acetylsalicylate manufactured by the Chemical Works of Gideon Richter, Budapest
- 2 Calcium Acetylsalicylate Tablets and powder made for us by Arner and Company, Buffalo, New York
- 3 Calcium Acetylsalicylate Powder prepared in the laboratory

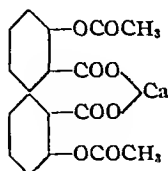
---

\* Aided by a grant from the Wodlinger fund

<sup>1</sup> Scientific Section, A. P. H. A., Madison meeting, 1933

## CHEMICAL COMPOSITION

Calcium acetylsalicylate is a definite chemical compound  $[C_6H_4O(CH_3CO)-COO]_2Ca$  with the following structural formula



## METHOD OF PREPARATION

Several methods of preparation are employed, which consist for the most part of neutralizing solutions of acetylsalicylic acid with some calcium base (1, 2)

In the study of the chemical, physical and pharmacological properties of calcium acetylsalicylate, a comparison was made with U S P preparations of acetylsalicylic acid obtained on the open market (Merck, Bayer). The following observations were made

## 1 Solubility

The solubilities of the various preparations were determined by the method of the U S P X and are expressed in the following table (averages of four samples)

Preparation	Cc of Solvent Required to Dissolve 1 Gm					Cottonseed Oil	Dog's Gastric Juice.
	Water	Alco hol	Ether	Chloro- form	0.4% HCl		
Calcium acetylsalicylate (unhydrolyzed)	6	416	1428	1428	12.9	Not clearly soluble	Slowly soluble
Kalmopyrin	5 <sup>1</sup>	400	435	666	12.7	Not clearly soluble	Slowly soluble
Acetylsalicylic acid (Merck)	300	5	10-15	17		Not clearly soluble	Slowly soluble

<sup>1</sup> Not clearly soluble in water

## 2 Tests for Identity and Purity

*a Reaction to Indicators*—Calcium acetylsalicylate (domestic) is neutral or faintly acid to litmus. It does not change color when phenolphthalein is added to an aqueous solution. Calcium acetylsalicylate (Kalmopyrin) is slightly acid to litmus.

*b Tests for Identity U S P Method*—The *melting point* of calcium acetylsalicylate (domestic) is 100-105° C, of calcium acetylsalicylate (foreign) is not definite (about 85° C), while that of acetylsalicylic acid is 132° C.

Other tests for the identity of calcium acetylsalicylate correspond to those of acetylsalicylic acid U S P.

*c Tests for Purity U S P*

Solution	TS of Lead Acetate	TS of Silver Nitrate.	TS Mercuric Chloride.	TS of Ammonium Oxalate	Color with Ferric Chloride TS
1 Calcium acetylsalicylate (unhydrolyzed)	No ppt	Gelatinous ppt	No ppt	White ppt (Ca)	Muddy brown but no violet color

2	Calcium acetylsalicylate (Kalmopyrin)	No ppt	Gelatinous ppt	No ppt	White ppt (Ca)	Brown violet
3	Acetylsalicylic acid (Merck)	No ppt	Gelatinous ppt	No ppt	No ppt	Faint violet

The U S P tests for organic impurities were negative in all three salts

### 3 Stability

In order to determine the stability of the calcium acetylsalicylate preparations, they were examined upon receipt for odor, appearance and the presence of free salicylic acid. This examination was repeated at monthly intervals for five months, with the results appearing in the following table

Preparation		At Time of Receipt	30 Days	60 Days	90 Days	120 Days	150 Days.
Calcium acetyl salicylate (domestic)	Odor	Earthy	No change	No change	No change	Slightly acetic	Acetic
	Appearance	Fine powder	No change	No change	No change	Slightly acetic	Slight change
	Free salicylic acid <sup>1</sup>	Negative	Negative	Negative	Negative	Trace	Definite
Calcium acetyl salicylate (Kalmopyrin)	Odor	Slightly acetic	Acetic	Acetic	Strongly acetic	Strongly acetic	Strongly acetic
	Appearance	Fine powder	Same	Fine crystalline deposit			
	Free salicylic acid	Trace	Definite to				Marked
Acetylsalicylic acid U S P	Odor	Earthy	No change throughout				
	Appearance	Fine powder	No change throughout				
	Free salicylic acid	Slight trace	No increase on standing				

<sup>1</sup> Attention should be called to the fact that the ordinary color reaction between free salicylic acid and ferric chloride is interfered with by the presence of calcium. The A O A C method of testing the ether extract should be employed.

The essential physical and chemical properties of calcium acetylsalicylate may be summarized as follows. It is freely soluble in water and very slightly soluble in ether, alcohol and chloroform while the reverse is true for acetylsalicylic acid. The differences between calcium acetylsalicylate and acetylsalicylic acid with respect to the various tests for identity and purity are dependent on the calcium (and chloride?) content. Upon first examination, the foreign preparation of calcium acetylsalicylate (Kalmopyrin) contained relatively large amounts of free salicylic acid in contrast with the domestic preparation and with acetylsalicylic acid. However, it was found that the domestic preparation was not permanently stable and as time went on, more and more free salicylic acid appeared. This instability was thought at first to be due to the methods of manufacture and calcium acetylsalicylate was prepared in the laboratory by a variety of methods. None, however, was successful in yielding a stable product. It was uniformly observed that the tablet preparations of calcium acetylsalicylate were more rapidly hydrolyzed than the powder presumably owing to the moisture necessary in tablet manufacture. Tablets kept in cardboard boxes preserved a good appearance.

although containing considerable free salicylic acid, while those kept in tightly stoppered containers became moist, discolored, and exhibited crystals of salicylic acid on the surface

#### PHARMACOLOGICAL STUDIES

Prior to the time that it became apparent that calcium acetylsalicylate was unstable, an investigation of the pharmacological actions of this preparation was undertaken particularly with reference to a comparison with similar actions of acetylsalicylic acid. The essential findings are indicated in the following sections

##### 1 Absorption and Excretion

Five healthy male adults ranging in age from 20 to 25 years were given 10-gram doses of calcium acetylsalicylate or acetylsalicylic acid with a small amount of water about two hours after the noon meal. The urine was examined at intervals and the time of the first appearance as well as the duration of excretion of salicylic acid (or salicyluric acid) in the urine determined. In ten experiments with calcium acetylsalicylate, salicylic acid appeared in the urine in 20, 40, 30, 30, 20, 30, 60, 30, 30 and 35 minutes, respectively, with an average of 32 minutes. In five experiments with acetylsalicylic acid, the results were 120, 60, 60, 45 and 120 minutes, respectively, with an average of 81 minutes. The average duration of excretion of salicylic acid in the urine after calcium acetylsalicylate administration was 33 hours, while with the acetylsalicylic acid it was 26 hours.

From these results, it appears that calcium acetylsalicylate is somewhat more rapidly absorbed but more slowly eliminated than acetylsalicylic acid.

##### 2 Gastric Irritation

An important consideration in salicylate medication is the irritant effect of such preparations upon the gastro-intestinal tract which may contribute to the nausea and vomiting which salicylates produce by central action after their absorption. Consequently it was considered advisable to compare the action of the calcium acetylsalicylate compounds with acetylsalicylic acid in this regard. This was done by intensive administration of the compounds to healthy dogs and noting the incidence of vomiting. A single dose of 1 Gm. per Kg. of either acetylsalicylic acid, calcium acetylsalicylate (Kalmopyrin) or calcium acetylsalicylate (unhydrolyzed) regularly induced vomiting in all dogs. Similarly vomiting regularly resulted in all dogs after two doses of 0.33 Gm. per Kg. each, repeated in 90 minutes. With a dose of 0.166 Gm. per Kg. repeated at intervals of 30 minutes, vomiting occurred with Kalmopyrin after the second dose, after the fourth dose of acetylsalicylic acid and after the fifth dose of the (unhydrolyzed) calcium acetylsalicylate. The foreign preparation of calcium acetylsalicylate (Kalmopyrin) which contained definite amounts of free salicylic acid is obviously more irritating than the other two. There is little or no difference in this regard between acetylsalicylic acid and the unhydrolyzed calcium acetylsalicylate. That the vomiting induced by these large doses administered in frequent intervals is reflex in character and due to gastric irritation is indicated both by the rapidity with which the emesis results after the administration and also by the fact that the emesis was produced with significantly less amounts of salicylate than can be tolerated

if the administration is such as to minimize the opportunities of irritation to the stomach. If, however, a dose is selected which is below the irritating dose and given at such a time interval that the administration is in excess of excretion, vomiting will then eventually occur, presumably due to the central action of the salicylates upon the vomiting center. That the salicylates may induce vomiting both by local gastric irritation and central action is also indicated at times by the effect of the single administration of very large doses. Immediate vomiting (due to local irritation) results. Then after three or four hours vomiting recurs apparently due to the central action of the salicylates which were not expelled by the vomiting.

### 3 Toxic Effect on the Kidneys

To determine the effect of these compounds upon the kidney, they were administered to healthy dogs in various dosages and time intervals and the incidence of albuminuria noted. Acetylsalicylic acid and the unhydrolyzed calcium acetyl salicylate in doses of 0.100 Gm. per Kg. per hour for five doses did not produce an albuminuria. Acetylsalicylic acid in doses of 0.166 Gm. per Kg. four times daily induced an albuminuria when the total dosage given had reached 0.800 Gm. per Kg. Unhydrolyzed calcium acetylsalicylate in doses of 0.166 Gm. per Kg. four times daily did not induce an albuminuria and the dog was sacrificed when the total dosage given had reached 0.60 Gm. per Kg. Although the number of animals employed is small, there is an indication of a marked difference between the compounds in their effect upon the kidney. Kalmopyrin is considerably more irritating than the other two, apparently due to the free salicylic acid present. On the other hand, the unhydrolyzed calcium acetylsalicylate appears to be definitely less irritating than acetylsalicylic acid.

### 4 Toxicity

Another important consideration in the intensive medication with the salicylates is the development of the so-called secondary signs of toxicity. In an effort to determine if any differences in the onset of the secondary symptoms of toxicity could be demonstrated, the compounds were administered in varying dosage levels to dogs. The onset of toxicity was determined by one or more of the following symptoms, convulsions, marked vertigo and staggering gait, marked asthenia or apparent disturbances in vision and hearing. At a dosage of 0.33 Gm. per Kg. repeated after 4 hours, dogs regularly vomited after the second dose with all compounds as indicated previously and it was not possible to continue administration at this dosage level. In the case of Kalmopyrin there was some evidence of toxic symptoms after the second dose.

At a dosage level of 0.165 Gm. per Kg. repeated at intervals of three times daily toxic symptoms developed with Kalmopyrin after the second dose, with acetylsalicylic acid after the twenty-eighth dose and with unhydrolyzed calcium acetylsalicylate after the thirty-seventh dose. At a dosage level of 0.100 Gm. per Kg. repeated at hourly intervals, toxic symptoms developed with Kalmopyrin after the second dose, with acetylsalicylic acid after the fourth dose and with calcium acetylsalicylate after the fourteenth dose. The dog receiving the acetylsalicylic acid died after the fourteenth dose. The one receiving the calcium acetyl



salicylate was carried for several days longer and the administration then discontinued

It is readily apparent from these results that Kalmopyrin is definitely more toxic than either of the other two compounds. There is likewise some indication that the unhydrolyzed calcium acetylsalicylate is less toxic than acetylsalicylic acid. The difference in toxicity appears to be greater than the difference in salicylate content of these compounds. From these results, it is not possible to state whether this apparent difference is due to a protective action of the calcium or to an alteration in the absorption and excretion rate which would vary the time required for the cumulative effect of these compounds to reach a toxic level in the blood or tissues.

It is difficult to determine the acutely fatal dose of such compounds as acetylsalicylic acid—as large doses given by mouth are promptly vomited and the compounds are too insoluble to be given readily by vein. For calcium acetylsalicylate, the intravenous fatal dose can be determined readily as it is sufficiently soluble. For calcium acetylsalicylate, the intravenous fatal dose in dogs was found to be between 0.60 and 0.75 Gm. per Kg.

#### SUMMARY

From this study, the following remarks seem warranted. The unhydrolyzed calcium acetylsalicylate has certain advantages over acetylsalicylic acid in that it is more soluble in water, more readily absorbed, has less tendency to produce an albuminuria and is apparently less toxic as judged by the development of the so called secondary signs of toxicity. It is apparently unstable, however, and as hydrolysis continues with the liberation of free salicylic acid, etc., it becomes more irritating to the gastric mucosa, more toxic and more likely to induce an albuminuria. This is illustrated by the results with Kalmopyrin in which such hydrolysis was quite marked.

#### REFERENCES

- (1) Coplans Myer, Patentschrift Nr. 534785, October 1, 1931
- (2) J. Altwegg, U. S. Patent Office No. 1,431,863

---

#### ADMINISTRATOR'S ORDER

In accordance with Schedule A, Section 5 of this code (a Code of Fair Competition for the Retail Trade, approved by the President on October 21, 1933), the representatives upon the national retail drug trade council may, until such time as the trade associations who presented the code for the retail drug trade shall have submitted for approval a method of electing representatives or until I shall otherwise designate, be those who have already been elected by, or appointed by the board of directors of the AMERICAN PHARMACEUTICAL ASSOCIATION, the Drug Institute of America, Inc., and the National Association of Retail Druggists.

HUGH S. JOHNSON,  
*Administrator for National Recovery*

Approved  
A. D. WHITESIDE, *Division Administrator*

WASHINGTON, D. C.  
October 24, 1933

## COLOR STANDARDS FOR COD LIVER OIL \*

BY ARTHUR D HOLMES AND FRANCIS TRIPP

The present pharmacopœia (1) provides that the color of cod liver oil shall be "pale yellow" Obviously this specification is not sufficiently definite to be of practical value As noted by Taub (2) the term "pale yellow" "may imply that a colorless oil would not meet the U S P requirements or it may leave the observer in doubt as to whether the oil in question is slightly darker than pale yellow"

After a careful study conducted to obtain satisfactory color standards for cod liver oils, Taub (2) has suggested the use of solutions of cobalt and ferris chlorides as originally proposed by Army (3) The proposal made by Taub for consideration by the Committee of Revision of the U S Pharmacopœia for interim revision of the text of U S P X and for continuation in U S P XI reads as follows

'The oil, when placed in a 4 ounce tall, cylindrical, standard oil sample bottle, and viewed transversely shall not be more highly colored than a solution placed in a similar bottle and containing 3.6 cc  $M/4$   $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ , 48.4 cc  $M/6$   $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$  and 68 cc of distilled water (Or if Standard No. 2 is adopted these figures would be 11 cc  $M/4$   $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$ , 76 cc  $M/6$   $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$  and 33 cc of distilled water)

'It would also be necessary to provide for two test solutions  $M/4$   $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$  contains 59.4965 Gm of this salt per liter of 1 per cent HCl  $M/6$   $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$  contains 45.054 Gm of this salt per liter of 1 per cent HCl Provision should be made for standardizing these solutions volumetrically, as described in a previous paper "

Obviously this specification is a decided improvement over the present provision relative to "pale yellow" oil but it is subject to some criticism It is difficult to accurately estimate the intensity of color by viewing transversely cylindrical bottles of oil The layer of oil to be viewed is over an inch thick at the center and rapidly decreases to no thickness at the sides, the glass sides of four-ounce, tall, cylindrical, standard oil-sample bottles are not uniform when viewed transversely, and no provision is made for a uniform source of light It was with a desire to improve upon these features of the proposed U S P color standards for cod liver oil that this study was undertaken

In comparing the color of a cod liver oil and the standard inorganic salt solution it is essential to view them through layers of equal depth and this was accomplished by using 50-cc Nessler Tubes (A P H A type) These, made of clear, colorless glass with polished bottoms, may be purchased of chemical supply houses in Matched Sets of six or twelve tubes Thus the operator is assured of columns of oil and standard of the same surface area and of the same depth Moreover, since the columns of oil and standard are eight and one-half inches deep a far more accurate comparison can be obtained than is possible by viewing layers of oil and standard which vary from about one and one-third inches to 0 inches in depth Moreover in comparing the colors of columns of oil and standard by viewing them vertically in Nessler tubes one looks directly at the oil and standard instead of viewing variable depths of oil and standard through convex glasses

Since the composition and intensity of daylight varies with the location of different laboratories, with the season of the year, from day to day, and even

\* Presented before the Division of Medicinal Chemistry, American Chemical Society, Chicago meeting

from hour to hour of the same day it seemed highly desirable to provide a source of light which could be conveniently duplicated in other laboratories. Taub (2) has very wisely pointed out that the method for testing the color of cod liver oil should be simple and inexpensive. Accordingly the apparatus devised for this study requires a minimum of materials and is easy of construction. If the services of a cabinet maker are available and the finished apparatus is carefully stained, a handsome piece of laboratory equipment can be produced. On the other hand any laboratory assistant who is at all adept with carpenters' tools can make the apparatus satisfactory for practical needs. The external appearance of the apparatus is illustrated in Fig. 1 and the details of its construction are shown in Fig. 2. One

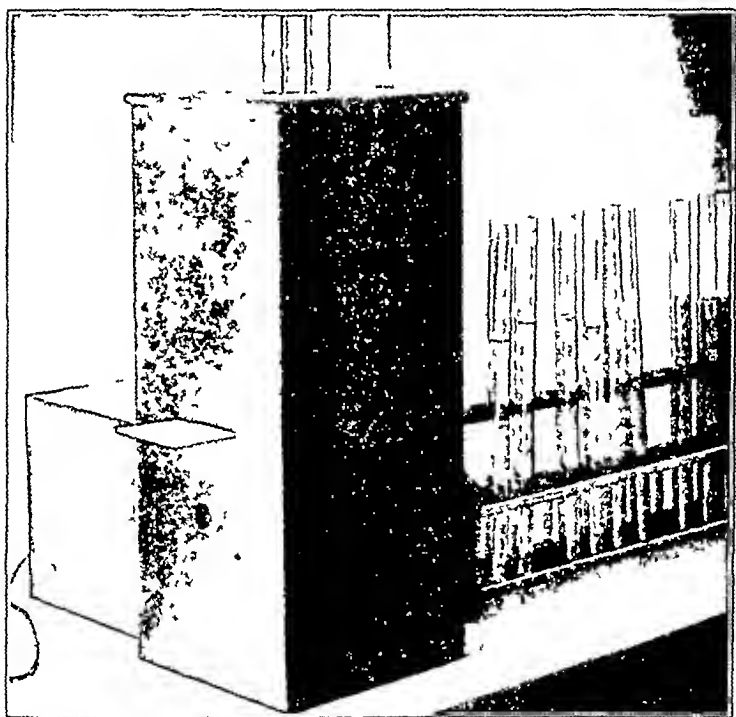


Fig. 1

feature not shown in Fig. 2 should be provided. Holes or slits should be made in the bottom and top of the sides of the lamp section to provide sufficient ventilation to prevent scorching the paint on the interior walls, for this would decrease the reflection of light to the under side of the ground glass upon which the Nessler tubes stand. In this connection it may be noted that the lamp, 100 Watt, blue, daylight Mazda, which is to be used as a source of light should be so placed that reflected light is obtained. If it is placed directly beneath the Nessler tubes unsatisfactory lighting results. As will be noted in Figs. 1 and 2 a tube of oil and of standard, or two tubes of standards with a tube of oil between are placed in the apparatus vertically so that the columns of oil and standard can be compared by viewing them vertically.

Coincident with tests of the color of an extensive series of cod liver oils a study was made of the permanence of the color of the proposed standard solution. A quantity of the standard solution was placed in four-ounce, tall, cylindrical, oil sample bottles since it was felt that thus the surface area exposed to light action would be equal to or greater than that of solutions stored in reagent bottles under average laboratory conditions. One of the bottles was placed in a wood cupboard from which practically all light was excluded. The second was placed on a laboratory reagent shelf. The third was placed on the roof and thus exposed to three

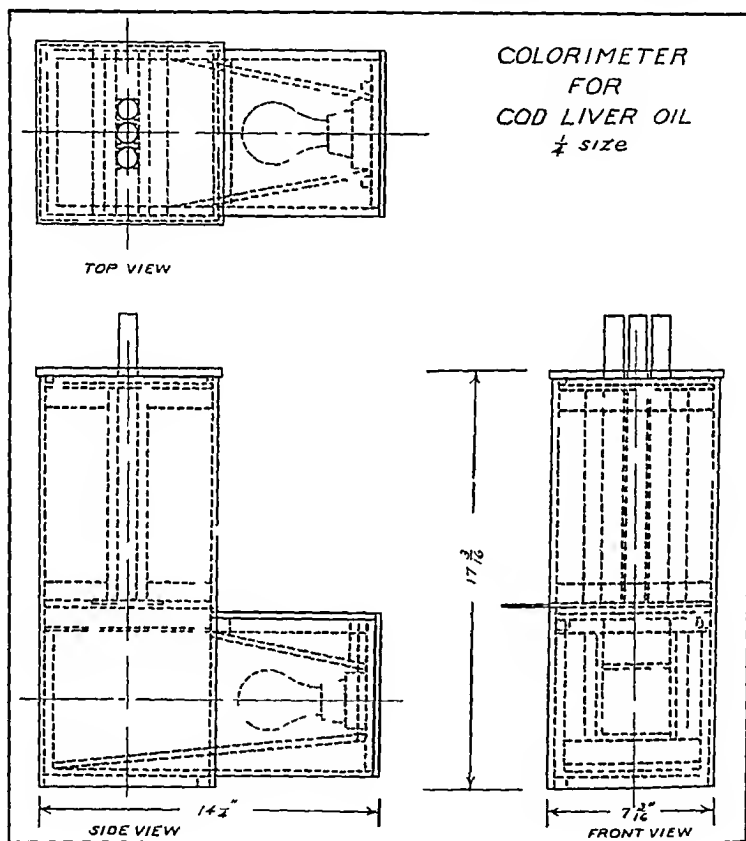


FIG 2

weeks of late May sunshine and the fourth bottle was subjected to Fade-ometer tests (4). The Atlas Electric Device Co. instrument that was used in these tests was provided with violet carbon arcs which had an electricity consumption of 13 amperes at 220 volts. It was claimed that one-quarter hour of the Fade-ometer light was equivalent to one hour of maximum intensity, noonday, June sunlight at 41° 50' N latitude. The standard solution was exposed to this light for 65 hours which would be equivalent to 260 hours of noonday, June sunlight at the latitude noted. Tests, made in the apparatus described above, of the color of the four samples five weeks after they were prepared revealed no difference in the color of

samples Nos 1, 2 and 3. The color of sample No 4 was noticeably though not seriously darker than sample No 1 which was used as a control. However, since the heat and light to which sample No 4 was subjected was so much more intense than that to which reagents are subjected it is assumed that the color of the standard solution is sufficiently "permanent" to remain constant during the period that standard solutions are ordinarily used for accurate quantitative analyses.

While the primary purpose of determining the color of a series of cod liver oils to be discussed later was to ascertain what proportion of average cod liver oils complied with the proposed color standard it seemed highly desirable to also determine to what extent the oils deviated from the standard. To provide such data additional solutions were prepared. Four of these which retained the shade but not the intensity of the color of the standard (U S P No 1) were prepared by diluting the standard with varying amounts of distilled water. These solutions numbered in sequence in order of increasing intensity of color constituted the first portion of the color scale used in this study. As will be noted on inspection of the formulas of the proposed U S P standards, "Standard No 2" which is suggested as the maximum color for medicinal oil is more intense and of a darker shade than "Standard No 1" which is also suggested as the maximum color for medicinal cod liver oil. Accordingly this difference was divided into four steps of increasing intensity and redness by preparing three solutions containing the requisite amounts of cobalt and iron chlorides. Hence, the color scale employed in this study consisted of nine solutions of cobalt and iron chlorides of which No 5 and No 9 were the proposed U S P standard solutions No 1 and No 2, respectively. The composition of the nine solutions computed on a liter basis are reported in Table I.

The series of over one hundred cod liver oils that have been compared with this color scale may be conveniently classified as crude oils, medicinal oils of American and European origin, old medicinal oils and cod liver pressings or cod liver stearin. Since the latter is a somewhat variable product and is little used for human consumption the results obtained in a comparison of these with the color scale will not be discussed here. Inasmuch as the free fatty acid content of cod liver oil is sometimes considered as indicating the age of an oil a free fatty acid determination was made for each of the oils studied.

Since crude cod liver oil is the oil as it is originally obtained from cod livers and since crude cod liver oil is the source of all medicinal cod liver oil the results obtained for the crude oils will receive first consideration in this discussion. These oils, which were principally of American origin, were produced at points along the Atlantic Coast from Cape Cod to Northern Newfoundland. The values assigned to the color of these oils and their free fatty acid content are reported in Table 2. In the absence of any data to the contrary it has been assumed that these oils have not received any alkali treatment and that the acid values represent the condition of the oils as they were extracted from the livers. An inspection of Table II reveals that only 16 of the 54 oils met the proposed U S P Color Standard No 1 for medicinal cod liver oil. Hence, 38 of this series of oils would have been denied entry to the United States had this proposed color standard been in force. Of these 38 oils six were without doubt too dark for use in the manufacture of medicinal oil. However, a question may properly be raised concerning the desirability of excluding

from the country those crude oils which are not greatly darker than the proposed U S P Standard No 1 Three of the oils under discussion, Nos 1310, 1386 and 1440, were taken from large lots of crude oil which were subsequently chilled and pressed in the routine manufacture of cod liver oil The resulting medicinal oils Nos 1316, 1409 and 1452, respectively, when sampled and compared with the color standards were found to be significantly lighter in color If these results can be considered as typical of crude oils then 32 of the oils reported in Table 2 as not meeting the proposed U S P Standard No 1 would comply with the specifications when chilled and pressed

COLOR OF COD LIVER OIL				TABLE I
FORMULAE FOR STANDARDS				
STANDARD NO	SOLUTION A * (CC PER LITER)	SOLUTION B X (CC PER LITER)	DISTILLED WATER (CC. PER LITER)	
1	15 00	201 67	783 33	
2	18 75	252 08	729 17	
3	22 50	302 50	675 00	
4	26 25	352 92	620 83	
5	30 00	403 33	566 67	
6	45 42	536 00	418 58	
7	60 83	618 75	320 42	
8	76 25	651 67	272 08	
9	91 67	633 33	275 00	
* SOLUTION A - 59 4965 GMS $\text{CoCl}_2 \cdot 6 \text{H}_2\text{O}$ PER LITER OF 1% HCL				
X SOLUTION B - 45 0540 GMS $\text{FeCl}_3 \cdot 6 \text{H}_2\text{O}$ PER LITER OF 1% HCL				

On referring to Table II it will be noted that the free fatty acid content of the crude oils studied varied from 0 144% for oil No 1466 to 1 565% for oil No 1282 It will also be noted that while the U S P X permits a maximum of 1 41% free fatty acid only one of the crude oils, No 1282, exceeded this value and with the exception of four other oils the fatty acid content of the 54 crude oils is less than two-thirds of the free fatty acid content permitted In fact many of the oils had a free fatty acid value of only one-fourth or one-third that permitted by the U S P The darkest of the 54 crude oils studied, Nos 1282, 1396, 1278, 1279 and 1280, have the highest free fatty acid values, namely, 1 565%, 1 033%, 1 022%, 1 075% and 1 053%, respectively On the other hand the free fatty acid values, 0 463%, 0 428%, 0 339%, 0 505%, 0 927% and 0 804%, which are for the lightest colored oils Nos 1437, 1318A, 1371, 1405, 1388 and 1447, respectively, were far from the lowest free fatty acid values obtained Moreover, the free fatty acid values of 0 144%, 0 264%, 0 296%, 0 304%, 0 331%, 0 332%, 0 348%, 0 355% and 0 356% for samples Nos 1466, 1365, 1361, 1384, 1360, 1385, 1296, 1379 and 1398 are for cod liver oils which are darker than the proposed U S P Standard No 1 A careful comparison of the free fatty acid content of the oils with the color values assigned to them will show that while there is a tendency for the darker oils to have high acid values and the lighter oils to have decidedly lower free fatty acid values there is no close correlation between the fatty acid value and the color of cod liver oil

The results obtained for medicinal oils of American origin appear in Table 3 As will be noted on referring to color values only two oils failed to comply with the proposed U S P Standard No 1 and those were only slightly darker than the

standard From the results obtained with this limited series of American oils it appears that these oils are of quite satisfactory color

LAB. NO.	CRUDE (AMERICAN)	FFA 7	COLOR SCALE								
			1	2	3	4	5	6	7	8	9
1282		1.565									
1405		0.505									
1388		0.927									
1396	"	1.033									
1445	"	0.905									
1447	"	0.604									
1278		1.022									
1279	"	1.075									
1280	"	1.053									
1317		0.445									
1336		0.382									
1382		0.484									
1387		0.792									
1389		0.710									
1446	"	0.347									
1448		0.537									
1475	"	0.553									
1476		0.501									
1466		0.144									
1320		0.587									
1335	"	0.536									
1398		0.356									
1438		0.620									
1480		0.444									
1365		0.264									
1366		0.499									
1362		0.598									
1296		0.348									
1297		0.459									
1433		0.674									
1477	"	0.686									
1364		0.483									
1360	"	0.331									
1379	"	0.355									
1385		0.392									
1361	"	0.296									
1381	"	0.464									
1384	"	0.304									
1363	"	0.364									
1380	"	0.474									
1298		0.481									
1318A		0.428									
1367		0.357									
1368		0.359									
1371		0.339									
1400		0.498									
1401	"	0.365									
1402	"	0.546									
1437	"	0.463									
1474		0.773									
1479		0.453									
1310		0.520									
1386		0.558									
1440		0.677									

Thirteen medicinal oils of European origin were compared with the color scale and the results are summarized in Table 4. Five of the oils were very light colored but five others or 38% of the group did not comply with the suggested U S P Color Standard No 1. Of these two were not greatly darker than the standard. However, if the oils under consideration are typical of European oils

then the adoption of the proposed U S P Standard No 1 would prevent entry into the United States of about one-third of European medicinal oils

In considering the color of cod liver oil it seemed pertinent to determine the influence of storage upon color Under normal storage conditions care is taken to

TABLE 3

**COLOR OF COD LIVER OIL**

LAB NO	MEDICINAL (AMERICAN)	FFA %	COLOR SCALE								
			1	2	3	4	5	6	7	8	9
829		0.561									
1247		0.684									
1271		0.653									
1288		1.050									
1316		0.519									
1342		0.477									
1376		0.442									
1408		0.572									
1409		0.590									
1411		0.576									
1423		0.546									
1452		0.660									
?											

TABLE 4

**COLOR OF COD LIVER OIL**

LAB NO	MEDICINAL (EUROPEAN)	FFA %	COLOR SCALE								
			1	2	3	4	5	6	7	8	9
1338		0.674									
1339		0.499									
1340		0.450									
1341		0.541									
1343	"	1.050									
1344		0.487									
1345		0.425									
1350	"	0.490									
1353		0.273									
1431	"	0.788									
1442	"	0.392									
1449		0.616									
1467		0.593									

TABLE 5

**COLOR OF COD LIVER OIL**

LAB NO	MEDICINAL OLD OILS (EUROPEAN)	FFA %	COLOR SCALE								
			1	2	3	4	5	6	7	8	9
1126		0.996									
1459		0.936									
1460		0.924									
1461		1.168									
1462		0.868									
1463		1.092									
1464		1.238									
1465		0.928									

protect oil from the air and thus reduce possible atmospheric oxidation to a minimum but for the purpose of this test it seemed desirable to determine the colors of oils that had been subjected to rigorous storage conditions Accordingly a series of European oils that had been stored under laboratory conditions in partially filled bottles for one to six years were tested As will be noted on referring to Table 5



five or approximately 60% were found to be darker than the suggested U S P Standard No 1 but it should be noted that four of these are only slightly darker than the standard. In general these oils are very little darker than the fresh European oils discussed in Table 4. On the other hand the acid values are much higher, in fact in some instances the reported acid values which were recently determined, when the color tests were made, are twice as high as when the oils were placed in storage. From these data and those reported above it is evident that there is no close correlation between the acidity and color of cod liver oils.

From the foregoing results it appears that the proposed U S P Standard No 1 (color No 5 of the scale used in this study) is a too rigorous specification for the maximum color of medicinal cod liver oil. On the other hand the proposed U S P Standard No 2 (color No 9 of the scale used in this study) is an altogether too lenient specification. The adoption of the proposed U S P Standard No 2 would permit the marketing, for medicinal purposes, of cod liver oils which are decidedly darker than the majority of present-day medicinal oils. Hence the results obtained with the oils discussed above indicate that the official color standard for medicinal cod liver oil should be somewhat darker than the proposed U S P Standard No 1 but decidedly lighter than the suggested U S P Standard No 2.

#### SUMMARY

The color of a series of over one hundred cod liver oils has been studied with apparatus designed for this purpose.

The permanency of the color of solutions of cobalt and iron chlorides suggested as U S P color standards for cod liver oil has been determined and found satisfactory.

In a series of 54 crude cod liver oils the greater portion were found to be darker than the U S P Standard No 1. However, when some of these oils were chilled and pressed in the usual manufacture of medicinal oil the crude oils became more than enough lighter in color to comply with this standard.

Nearly all the American medicinal oils met the proposed U S P Color Standard No 1 but about one-third of the European oils were unsatisfactory as regards color. Old oils which had been stored under unfavorable conditions were nearly as light colored as fresh oils of similar origin. However, the acid content of the old oils greatly exceeded that of the fresh oils.

While there is a tendency for dark colored oils to have high acid values and light colored oils to have low acid values there was no consistent correlation between acid value and color of the oils studied.

The proposed U S P standards for color represent a definite advance in the standardization of the color of medicinal cod liver oil. However, the results obtained in this investigation indicate that the official color standard for medicinal cod liver oil should be darker than the proposed U S P Standard No 1 but decidedly lighter colored than the suggested U S P Standard No 2.

#### REFERENCES

- (1) Pharmacopoeia of the United States, Tenth Decennial Revision (1926), 263 J B Lippincott Company, Philadelphia, Pa
- (2) A Taub, *Jour A Ph A*, 22 (1933), 194
- (3) Arny and Taub, *Jour A Ph A* 12 (1933), 839
- (4) Data supplied by Mr Fred Tripp, Mt Hope Finishing Co, North Dighton, Mass

# BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A G DuMez Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A G DuMez, University of Maryland School of Pharmacy, N W cor Lombard and Greene Sts , Baltimore, Maryland

## PHARMACOPŒAS AND FORMULARIES

- Gjaldbock, J K  
Chemicals of the Danish Pharmacopœia, 1933  
*Arch Pharm Chem*, 40 (1933), 543  
Rosenthaler L  
The Swiss Pharmacopœia V  
*Pharm Zentralh* 74 (1933), 579

## PHARMACEUTICAL PREPARATIONS

- Bordeianu, C V  
Mercury oxycyanide tabules  
*Arch Pharm*, 27 (1933), 149  
Coppens, Ph A  
Sterilization of iodoform  
*Pharm Weekbl* 70 (1933), 1053  
Focke, C  
Stabilization of digitalis preparations with glycerol  
*Arch Pharm*, 271 (1933), 248  
Goris, A  
General method for the preparation of fluid-extracts for syrups  
*Bull sci pharmacol*, 40 (1933) 385  
Jensen, Vieh and Orner Holger  
Investigation of substances used for the preservation of medicaments  
*Dansk Tids Farm*, 7 (1933) 183  
Mihalovici, Ar  
Sterilization of sodium bicarbonate solution  
*Pharm Zentralh* 74 (1933) 615  
Perrino M  
Investigation of some commercial fluidextracts of the Italian Pharmacopœia V  
*Boll chim farm*, 72 (1933), 481 through  
*Chem Abstr*, 27 (1933), 5143  
Reese, J A and Crockett W G  
Miscible fluidextract of ipecac  
*Jour A Ph A* 22 (1933) 968  
Rohmann C  
Investigation of the half basic aluminum acetate solution  
*Arch Pharm*, 271 (1933) 219

- Rojahn C A , and Haast, Edgar  
Changes in tinctures and alkaloidal solutions due to sunlight and ultraviolet rays with observations on optical rotation  
*Pharm Zentralh*, 74 (1933), 625  
Rosenthaler, L  
Investigation of galenical preparations I—  
Bitter almond water and cherry laurel water  
*Pharm Ztg*, 78 (1933) 1063  
Rowe, L W , and Scoville, Wilbur L  
Fluidextract of ergot  
*Jour A Ph A*, 22 (1933), 938  
Trunkel, H  
Preparation of tinctures and fluidextracts  
*Pharm Ztg*, 78 (1933), 1054

## PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

- Fleury, Georges  
Action of smoking tobacco on cultures of colon bacillus and of typhous bacillus  
*Bull soc pharm Bordeaux*, 71 (1933), 207  
Fourneau, E and Matti, J  
Local anesthetics—esters of amino alcohols with salicylic acid and other phenolic acids  
*J pharm chim*, 18 (1933) 247  
Kwit, Nathaniel T , and Hatcher Robert A  
Seat of the emetic action of pilocarpine  
*J Pharmacol & Exper Therap*, 49 (1933), 215  
Larget, Maurice, et al  
Note on the anticoagulant action of trisodium citrate  
*Bull sci pharmacol*, 40 (1933), 408  
Maloney A H  
Comparative study of the antidotal action of picrotoxin, strychnine and cocaine in acute intoxication by the barbiturates  
*J Pharmacol & Exper Therap*, 49 (1933), 133  
Morgan Agnes Fay, et al  
Effect of carbon dioxide and sodium benzoate on vitamin C content of orange juice  
*Ind Eng Chem*, 25 (1933), 1174

Munch, James C, *et al*  
 Lactucaria I Mydriatic activity of lactucaria  
 by the Munch method  
*Jour A Ph A*, 22 (1933), 943  
 Ogata, A, and Hiraao, S  
 Researches of the male sex hormones IV  
*J Pharm Soc Japan*, No 619 (1933), 153  
 Rich, Murray L  
 An unusual hematologic reaction to neo-  
 arsphenamine  
*J A U A*, 101 (1933), 1223  
 Stevens, Asa N  
 Standardization of ergot  
*Jour A Ph A*, 22 (1933), 940

## BOTANY AND PHARMACOGNOSY

Akai and Nakazawa  
 Constituents of *Dicranopteris glauca* Nakai  
*J Pharm Soc Japan*, No 619 (1933), 157  
 Bondeson Wolmar  
*Euphorbia pilulifera* herb  
*Farm Revy*, 32 (1933), 561 580, 599 610  
 Edman Costa  
 Silica in *Quassia amara* L  
*Farm Revy*, 32 (1933), 557, 577  
 Hansche, Rachel, and Still, E U  
 Study of the properties of psyllium seed  
*Am J Pharm*, 105 (1933) 433  
 Freise, Fred W  
 Brazilian coto bark and its source  
*Pharm Zentralh*, 74 (1933), 577  
 Gillet, Paul  
 Investigation of the seeds of *Euphorbia exiguus*  
 L  
*Bull sci pharmacol*, 40 (1933), 449  
 Mascré, M., and Genot, H  
 New experiments in the cultivation of *Lobelia*  
*inflata* L  
*Bull sci pharmacol*, 40 (1933), 153  
 Munesada, and Hayashi, M  
 Pharmacognostical investigation of Japanese  
 anemone root  
*J Pharm Soc Japan*, No 619 (1933) 162  
 Rumington, Claude  
 Isolation and chemical examination of the  
 poisonous principles of *Dymorphotheca Spec-*  
*tabilis* Schltr and *D zeyheri* Sond  
*Rept Dir Vet Services*, Onderspoort 18,  
 Part 2 (1933) 955, through *Chem Abstr*  
 27 (1933), 5144

## ALKALOIDS AND GLUCOSIDES

Anon  
 Collaboration comparison of five opium assay  
 procedures

*Am J Pharm*, 105 (1933), 458  
 Baumgarten, G  
 Extraction of morphine from opium by the lime  
 method  
*Arch Pharm*, 271 (1933), 216  
 Dietzel, R, and Steeger, O  
 Decomposition of alkaloids in aqueous solution,  
 especially on sterilization VI Ecgonine  
*Arch Pharm*, 271 (1933), 251  
 Fujiwara, Hidekatsu  
 Color reactions of strychnine and of strych-  
 nine nitrate  
*J Biochem (Japan)*, 18 (1933), 153, through  
*Chem Abstr*, 27 (1933), 5145  
 Klyachkina B A, and Shtuber, E Ya  
 New method for the estimation of morphine,  
 especially in small amounts  
*Arch Pharm*, 271 (1933) 217  
 Leger, E  
 Assay of nux vomica preparations  
*J pharm chim*, 18 (1933), 281  
 Neugebauer H  
 Simple alkaloidal assay method for hydrastis  
 and fluidextract of hydrastis, also homeo-  
 pathic mother tinctures  
*Pharm Ztg*, 78 (1933), 1077  
 Williams, G D, and Fulton, C C  
 Microscopic identification of heroine  
*Am J Pharm*, 105 (1933), 436

## ESSENTIAL OILS

Bogert, M T, and Marion S J  
 Chemical examination of the oil of *Sarothra*  
*Gentianoides* and the detection of nonane  
*J Am Chem Soc*, 55 (1933) 4187  
 Freise, Frederick W  
 South American rose wood oil and the plants  
 of origin  
*Perf & Ess Oil Rec*, 24 (1933), 307  
 Will, H  
 Essential oil content of 1933 chamomile  
*Apoth - Ztg*, 48 (1933), 1134

## OILS, FATS AND WAXES

Rojahn C A, and Haugg Josef  
 Determination of fats, oils and fatty acids by  
 fusing with wax or ceresin  
*Apoth - Ztg*, 48 (1933), 1117

## ANALYTICAL METHODS AND RESULTS

Bach, D  
 Determination of nitric nitrogen by the Devarda  
 method  
*Bull sci pharmacol*, 40 (1933), 459

Breugelmans J G

Observations and criticisms of some of the analytical methods of the Belgian Pharmacopœia IV

*J pharm Belg*, 15 (1933) 677 697, 717

Bye, Mortimer *et al*

Assay method for fluidextract of ipecac U S P

*Jour A Ph A* 22 (1933), 965

Cuny L, and Robert, J

Observations on the determination of iodine in powdered thyroid gland

*J pharm chim*, 18 (1933) 233

Guerbet Andre

Determination of free iodine in iodides by means of nitrous acid

*J pharm chim*, 18 (1933) 258

Kampf, Paul

Studies on the standardization of drugs and the detection of adulterations with the aid of capillary analysis and the quartz lamp

*Pharm Acta Helv* 8 (1933), 170

Kolthoff I M

Gravimetric and volumetric determination of antipyrine as hydroferrocyanide in the presence of amidopyrine

*Jour A Ph A* 22 (1933), 947

Schmidt, Jacob E and Krantz John C Jr

Modified assay process for alkali benzoates and salicylates

*Jour A Ph A* 22 (1933), 953

Stamier Carl and Leclercq, Leon

Determination of silver in such organic compounds as collargol, argyrol, protargol, etc

*J pharm Belg* 15 (1933) 693

Wagenaar M

Microscopical detection of glucose

*Pharm Weekbl* 70 (1933) 1029

## ORGANIC CHEMICALS

Aoyama, *et al*

Purity *p*-nitrophenol from *p*-nitrobenzol, *p*-phenetidin and phenacetin

*J Pharm Soc Japan*, No 619 (1933) 170

Aurisicchio G

Gluconic acid and gluconates, and their variable optical rotations

*I Ind Chimica* 8 (1933), 836, through *J*

*Sci Chem Ind* 52 (1933) 764

Caspe Saul

By-product sodium morrhuate

*Ind Eng Chem*, 25 (1933) 1177

Germann F E E, and Knight O S

Preparation of pure triethanolamine

*J Am Chem Soc* 55 (1933) 4150

Huston, R C and Chen, P S

The chloro derivatives of *m*-cresol

*J Am Chem Soc* 55 (1933), 4214

Lang J B

New ointment bases of the Swiss Pharmacopœia V Preparation of cetyl alcohol

*Pharm Acta Helv*, 8 (1933) 165

Lecoq Raoul

Proteides and vitamine B

*Bull sci pharmacol*, 40 (1933) 470

Nobile L

Thermal study of some analgesic mixtures

*Boll chim-farm*, 72 (1933), 361 through *Chem Abstr*, 27 (1933), 5143

Rae, John

Ethylene glycol as a solvent of vegetable coloring matter

*Pharm J*, 131 (1933) 369

Suzuki H, *et al*

Comparison of samples of commercial acetylsalicylic acid obtained in Japan

*J Pharm Soc Japan*, No 619 (1933) 160

## AMARANTH AS A SUBSTITUTE FOR CUDBEAR WITH IMPROVED METHODS IN THE PREPARATION OF SOME N F GALENICALS \*

BY S W MORRISON

In the past, cudbear has been the favored coloring agent for pharmaceutical preparations because it is of vegetable origin, reasonably cheap and compatible with most substances. It is not, however, the ideal agent as it is variable in color, it hinders filtration, the color changes in acid and alkaline solutions and the color fades.

In seeking to find a more desirable coloring agent, amaranth was tried. Amaranth is a synthetic organic dye which has been in use for many years and in 1906

\* Section on Practical Pharmacy and Dispensing *A Ph A*, Madison meeting 1933

was accepted by the Department of Agriculture for meeting the requirements of the Pure Food and Drugs Act

It has been reported by H. Fühner in the "Handbuch of Experimental Pharmacologie," 1 (1923), 1199, to be inert physiologically. Four-gram doses were administered repeatedly to dogs with no effect. The urine was not colored by the dye when given orally but did show some color when amaranth was given intravenously. Intravenous injections produced no effect on the dogs.

Amaranth has many advantages over cudbear. It is a definite chemical compound which is never variable in color, it does not slow the filtration of solutions in which it is used and is cheaper than cudbear. It is readily obtainable through the wholesale drug or chemical companies in 10-Gm. bottles at 50 cents or in larger packages at \$7.60 a pound. The cost of amaranth required for coloring is only one-half as much as the cost of cudbear for the same preparation. Amaranth is permanent in color under ordinary conditions and does not change color in weak acid or alkaline solutions. For convenience and greater accuracy in handling amaranth, a 1% solution in 15% alcohol was used. The solution is stable under ordinary conditions and keeps indefinitely.

The directions for the manufacture of Alkaline Aromatic Solution, N. F. have given some trouble, due to the cudbear in the formula. The powdered cudbear, when added to the solution as directed, hinders the filtration tremendously. The cudbear itself has been found to vary greatly in quality and color. The use of Tincture of Cudbear in place of the powdered form would be a great improvement. The solution was prepared according to the N. F. V. directions except that no cudbear was used and only 3.5 Gm. of magnesium carbonate was used for clarification. Four cc. of 1% solution of amaranth was added and sufficient distilled water to make one liter. The solution was then filtered. Filtration was rapid and a crystal clear solution was obtained. The amaranth gives a brilliant red color while the cudbear produces a less desirable bluish red color.

#### COMPOUND ELIXIR OF PEPSIN, N. F. V.

The present formula and directions for the manufacture of Compound Elixir of Pepsin are unsatisfactory. Cudbear hinders filtration and the high percentage of glycerin in the elixir, likewise, lengthens the time required for filtration.

The following changes in the formula are recommended:

Dissolve the pepsin and lactic acid in 500 cc. of distilled water. Dissolve the oil of orange in the alcohol and add 4 cc. of 1% amaranth solution. Mix with the pepsin solution and filter. The solution filters very quickly. Add the glycerin to the clear filtrate and sufficient distilled water to make one liter of elixir. Mix.

This method eliminates the two hour delay necessary when cudbear is used. The solution will remain clear after adding the glycerin and the entire elixir may be completed in a very short time.

#### ELIXIR OF THREE BROMIDES, N. F. V.

The chief difficulty in the manufacture of this elixir has been due to the cudbear. It has hindered filtration, and some cudbear on the market often imparts only a light pink color to the elixir when made according to the N. F. V. directions.

It is apparent that the amount of cudbear must be increased or else the tincture of cudbear should be substituted

Amaranth was used in place of cudbear and eliminated all the difficulties. The elixir was prepared as directed in the N F V except that 4 cc of the 1% solution of amaranth was substituted for the cudbear and the elixir was filtered immediately. Filtration was rapid, there was no delay, due to extraction of color and the color was always uniform and free from the less desirable bluish red color.

Red Aromatic Elixir, mouth wash and Compound Syrup of Phosphates may likewise be made with amaranth in place of cudbear or fuchsin. The use of amaranth might also eliminate the use of cochineal solution and carmine solution.

There has been some doubt concerning the permanency of amaranth. To determine the stability of the color, alkaline, neutral and acid solutions were prepared. Alkaline Aromatic Solution, N F V was made with cudbear as directed and another portion was made with amaranth. Likewise, Elixir of Three Bromides, N F V and Compound Elixir of Pepsin N F V were prepared with both cudbear and amaranth. Mouth wash, N F V was also made and colored with amaranth.

The degree and intensity of color of each preparation was determined by comparison with colored glass slides using the Lovibond tintometer. In order to match the color of the cudbear in alkaline solutions it was necessary to use a dilute solution of indigocarmine with the colored glass slides.

The galeicals were then placed in 3 fl-oz flint glass, tightly stoppered bottles, and placed on a shelf near a south window where they were kept for 5 months exposed to bright diffused light.

After standing 5 months, the intensity of color of each galeical was determined again with the tintometer.

The solutions were then placed in direct sunlight where they were exposed to the intense sunlight for 22 hours during the period of June 1st-16th, and only at midday. After this severe test the colors were again checked on the tintometer.

The following table gives the results of the experiment

DEGREES OF COLOR WITH THE TINTOMETER

	Thickness of Cell	At Time of Mfg 1/6/33	5 Mo in Bright Diffused Light 6/5/33	22 Hrs Direct Sun Light 6/20/33	% Loss of Color after En- tire Exp
Liq Arom Alk with amaranth	1/16"	2 2	2 0	1/8" 3 6	18%
Elix Brom Tri with amaranth made 12/20/32	1/16"	2 0	1/8" 4 0	1/8" 4 0	None
Elix Brom Tri with amaranth made 1/6/33	1/16"	1 6	1/8" 3 2	1/8" 3 2	None
Elix Pepsin Co with amaranth made 12/12/32	1/8"	1 2	1/4" 2 5	1/4" 2 3	8%
Elix Pepsin Co with amaranth made 1/5/33	1/16"	8 0	1/16" 7 6	1/16" 7 0	12 5%
Elix Pepsin Co with amaranth made 1/6/33	1/16"	5 0	1/16" 4 6	1/16" 3 5	31%
Liq Arom Alk with cudbear made 12/20/32	1/16"	5 0	1/8" 3 2	1/4" 2 6	86%
Elix Brom Tri with cudbear	1/2"	4 6	1/2" 3 0	Changed to orange	Approx 40%

Eliv Pepsin Co with cudbear made 12/20/32	$\frac{1}{8}$ "	2 3	$\frac{1}{4}$ "	3 0	$\frac{1}{4}$ "	2 4	48%
Eliv Pepsin Co with cudbear made 1/5/33	$\frac{1}{16}$ "	2 6	$\frac{1}{16}$ "	2 4	$\frac{1}{8}$ "	4 0	24%
Eliv Pepsin Co with cudbear made 1/6/33	$\frac{1}{8}$ "	2 2	$\frac{1}{8}$ "	2 2	$\frac{1}{4}$ "	3 0	31%
Lavat Ori with amarantli	$\frac{1}{8}$ "	1 5	$\frac{1}{8}$ "	1 5	Changed to orange		

In no case did the preparations colored with amarantli show any loss of color after standing 5 months exposed to bright light Those colored with cudbear did show a loss of color

After exposure to direct sunlight, Compound Elixir of Pepsin colored with amarantli (an acid solution) showed a slight degree of fading (8-31%), but practically none in the alkaline solutions (0-18%) Amarantli is most stable in the alkaline solutions

The cudbear faded considerably more than the amarantli and is more stable in the acid solutions than in alkaline Loss of color in acid solution was 24-48% while in the alkaline solutions the per cent loss of color was 40-86%

In preparations lightly colored with amarantli the fading is apparently more rapid than when amarantli is present in greater amounts The amarantli tends to change to an orange-red color on exposure to direct sunlight, but there is no change under ordinary conditions The mouth wash showed the greatest change in color but only after exposure to direct sunlight

There may be some restrictions on the use of amarantli in certain states, because it is a so called coal-tar dye but those pharmacists who are permitted to use it will find amarantli a great improvement in the manufacture of the galenicals discussed

UNIVERSITY OF ILLINOIS  
COLLEGE OF PHARMACY

## SOME USEFUL PRESCRIPTIONS FOR THE DENTAL PROFESSION \*

BY A O MICKELSEN <sup>1</sup>

The professional rating of pharmacy is maintained and advanced through unceasing efforts in research, education and practice of professional pharmacy in the retail field Because merchandizing occupies such an important part in maintaining the business, the struggle to advance pharmacy on a high professional plane is no small task It is so easy to shift the technical professional work to a few who see the advantage of professional business and accept instead just the selling of professional products This should be discouraged Compounding of prescriptions and useful formulas must be retained in the average retail store if pharmacy is to advance or maintain its professional rating The following quotation may well apply to the practice of professional pharmacy "In a country rich in gold observant wayfarers may find nuggets on their path, but only systematic mining can provide the currency of nations" (F Gowland Hopkins) Applying the

\* Section on Practical Pharmacy and Dispensing, A PH A Madison meeting, 1933

<sup>1</sup> Dean School of Pharmacy North Pacific College of Oregon, Portland, Oregon

quotation to the practice of professional pharmacy—in a country rich in medical service, physicians and dentists may write original prescriptions now and then, making the pharmacist feel professional, but only systematic training, constant professional efforts and detailing the physicians and dentists for their original prescriptions can maintain pharmacy as a profession. The professional services which may be rendered by pharmacists are far reaching and not restricted to physicians alone. Modern dentistry has brought to light a need for the professional services of the pharmacist which should not be overlooked. A closer professional relationship is necessary between the physicians, dentists and pharmacists to bring about the most effective needs of humanity and eliminate self-medication as far as possible.

In the June number, 1933, of the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION appears my article on "Detailing the Dentist for His Prescriptions." The purpose of this paper is to follow up the detail work and to suggest a few useful formulas which may be used by the dentist in his routine practice, or prescribed for his patients if continued treatment is necessary.

Following are a few suggested formulas, compiled especially for my dental pharmacy work at North Pacific College of Oregon.

#### *Formula No 1*

Hand Cream (Stearic Acid Type Frederick Grill, North Pacific College of Oregon)

Stearic acid	40 00 Gm
Lanolin (anhydrous)	2 00 Gm
Triethanolamine	4 00 Gm
Tincture of benzoin	0 75 cc
Perfume <i>q s</i>	
Water	100 00 cc

Melt the stearic acid on a water-bath dissolve the triethanolamine in the water and heat to boiling, add this solution to the stearic acid stirring constantly. Continue stirring until cool then add the Tincture of Benzoin and perfume.

Alterations if desired

- (1) Rose water to replace water
- (2) Rose water and witch hazel to replace water
- (3) Small amount of glycerin to replace equal quantity of water
- (4) Oil of lavender is a desirable perfume

This preparation furnishes an excellent emollient hand cream for office use.

#### *Formula No 2*

Hand Lotion

Lanolin emulsion	20 00 cc
Tincture of benzoin	7 50 cc
Glycerin	120 00 cc
Rose water	100 00 cc

Add the rose water slowly with rapid stirring to the lanolin emulsion then add the other ingredients in a similar manner. The lanolin emulsion is prepared as follows:

Lanolin	80 00 Gm
Stearic acid	15 00 Gm
Triethanolamine	5 00 Gm
Water	200 00 cc



Weigh the amount of triethanolamine and stearic acid and add to the water. Heat the mixture on a water bath until the stearic acid is melted, resulting in a creamy soap solution. Add the lanolin and continue heating without stirring until the lanolin is melted, then stir intermittently until the emulsion has cooled. This may be retained as a stock emulsion.

It is most desirable for the dentist to maintain his hands in a soft condition as dental laboratory work has a tendency to keep the hands rough. This lotion is an excellent preparation to use after doing laboratory work.

*Formula No 3*

Mouth Wash

Saccharin, soluble	0 10 Gm
Fuchsin, basic	0 02 Gm
Oil of cinnamon	0 25 cc
Oil of peppermint	0 25 cc
Oil of clove	0 50 cc
Alcohol	300 00 cc
Talc	10 00 Gm
Distilled water <i>q s</i>	1000 00 cc

Dissolve the saccharin in 10 cc of water and the fuchsin and volatile oils in 250 cc of alcohol, add slowly to the 700 cc of water and filter through talc. Finally, add the remaining 50 cc of alcohol to make 1000 cc of finished product.

This is a non medicated mouth rinse, colored and flavored. It may be diluted with 2-3 parts of water and used to rinse mouth, leaving a pleasant after taste.

In preparing this mouth wash my experience proves that Tincture of Cudbear is more desirable for coloring than basic fuchsin. This is also suggested by Assistant Dean Schicks.

*Formula No 4*

Neutral Antiseptic Powder

Sodium chloride, powdered	30 00 Gm
Sucrose (Powd)	20 00 Gm
Oil of cinnamon	0 25 cc
Oil of clove	0 50 cc
Oil of peppermint	0 25 cc
<i>M Ft Pulv</i>	

*Sig* Dissolve one half teaspoonful in a half glass of diluted mouth wash (Formula No 3) and use to rinse mouth. Salt solution is extensively used to cleanse mucous surfaces, to restrain hemorrhage, to remove pus and to soothe and protect inflamed areas. The above preparation is suitable for dental use.

*Formula No 5*

Liquor Sodæ Chlorinatæ Chirurgicæ U S P X

This useful preparation if diluted with 1 to 2 parts of diluted mouth wash (Formula No 3) will mask the objectionable taste, but still be effective for immediate use. Hypochlorite solutions disinfect very rapidly also having the power to dissolve necrotic tissue without attacking normal tissue, pus cells and dead material in the wound are softened and washed away. An excellent preparation for septic sores often found in the mouth.

*Formula No 6*

Alkaline Antiseptic Powder

Potassium bicarbonate	30 00 Gm
Sodium borate	30 00 Gm
Thymol	0 50 Gm
Eucalyptol	1 50 cc
Methyl salicylate	1 00 cc
<i>M Ft Pulv</i>	

*Sig* Dissolve one half teaspoonful in a glass of diluted mouth wash (Formula No 3) and use to rinse mouth The chief purpose of this solution is to reduce irritation, by virtue of the alkalinity the mucous is dissolved, thus cleansing the mucous membrane Any acid present is neutralized leaving the mouth in a suitable condition for continued medication

*Formula No 7*

Acid Astringent Antiseptic Powder

Boric acid	30 00 Gm
Powdered alum	15 00 Gm
Thymol	1 00 Gm
Menthol	1 00 Gm
<i>M Ft Pulv</i>	

*Sig* Dissolve one-half teaspoonful in a half glass of diluted mouth wash (Formula No 3) and use to rinse mouth This powder may also be used in powder form This preparation may accelerate healing of canker sores or other ulcerations in the mouth In case of spongy and receding gums or to prevent excessive hemorrhage during operation, this solution should be most helpful

*Formula No 8*

Oxidizing Powder for Mouth Wash

(Dean George C Schicks)

Sodium perborate	100 00 Gm
Carmine No 40	0 03 Gm
Oil of cinnamon	2 00 cc
<i>M Ft Pulv</i>	
Dispense in a bottle	

*Sig* Dissolve a half teaspoonful in one-half glass of diluted mouth wash (Formula No 3) and rinse mouth (Use fresh solution only) The efficiency of this preparation is largely due to the slow liberation of hydrogen dioxide, and it may be used in powdered form or any concentration In solution it liberates from 9% to 10% of oxygen Sodium perborate is devoid of erosive action upon the teeth therefore, it is suitable as a dentifrice It is ant acid and a mouth antiseptic It is an effective treatment for Vincent infection

*Formula No 9*

Tooth Powder

Sodium perborate	60 00 Gm
Sodium chloride powdered	40 00 Gm
Sodium benzoate	10 00 Gm
Sodium bicarbonate	30 00 Gm
Flavoring, sufficient	
Mix and make a fine powder	Dispense in a bottle

*Sig* Use as a tooth powder

This powder would be an excellent remedy for spongy and receding gums and as a daily dentifrice during treatment of any infectious condition of the oral cavity It is non abrasive and devoid of erosive action upon the teeth

*Formula No 10*

Compound Acetphenetidin Capsules

Acetphenetidin	gr xxx
Acetylsalicylic acid	gr l
Caffeine	gr xii
<i>Ft Caps No xii</i>	

*Sig* One capsule every two hours to relieve pain

It is needless to elaborate on the usefulness of this prescription after extraction or to relieve distress after sitting in the dental chair for an hour. The usual results are most satisfactory. It should only be used or prescribed by directed medication by the practitioner.

*Formula No 11*

Dental Polishing Paste

Powdered pumice (fine)	45 00 Gm
Powdered talc	15 00 Gm
Carmine powder	0 01 Gm
Massing fluid (about)	33 00 cc
Flavoring mixture	0 75 cc

The powders should be passed through a No. 80 sieve.

This paste is for professional use only. The mass should not be too soft, a small bottle of massing fluid should be furnished to maintain the proper consistency of the paste for office use.

Massing Fluid

Gelatin	1 00 Gm
Glycerin	90 00 cc
Water	90 00 cc
Saccharin	5 tablets

Flavoring Mixture

Oil clove	3 00 cc
Oil wintergreen	16 00 cc
Oil peppermint	24 00 cc
Oil cinnamon	0 10
Oil anise	1 00

This flavoring mixture is suitable either for tooth pastes or powders.

In summary—Formula No. 3 is a pleasant non-medicated mouth rinse when used as directed, or it serves to supply the practitioner with a vehicle which may be medicated. Five preparations have been suggested for this purpose, covering the average needs of the dental practitioner. The flavoring in each case masks the objectionable taste, leaving a pleasant after-taste in the patient's mouth. The powders may also be used directly in powder form to suit the needs of the practitioner.

- 1 Formula No. 4—Neutral antiseptic powder for cleansing mucous surfaces
- 2 Formula No. 5—Chlorinated solution, antiseptic in action and dissolves necrotic tissue
- 3 Formula No. 6—Alkaline in reaction, solvent for mucin, antiseptic and reduces irritation
- 4 Formula No. 7—Slightly acid in reaction, antiseptic and allays hemorrhage
- 5 Formula No. 8—A powder which liberates oxygen in solution, cleansing and antiseptic

The foregoing formulas are intended for professional use only, to be used by the practitioner in his office, or prescribed by him for his patients.

## AN HISTORICAL NOTE ON THE OFFICIAL ROSIN CERATES \*

BY JOSEPH W. ENGLAND, PH. M.

There are two rosin or resin cerates official—the Ceratum Resinae, or Rosin Cerate of the present U. S. Pharmacopœia, sometimes called Basilicon Ointment, and the Ceratum Resinae Compositum or Compound Rosin Cerate (Deshler's

\* Presented to the Section on Historical Pharmacy A. P. H. A., Madison Wis., August 1933

Salve), formerly recognized by the U S Pharmacopœia, and now by the National Formulary

Rosin Cerate, or Basilicon Ointment is much used as a gently stimulating and protective application to blistered surfaces, indolent ulcers, burns, scalds and chilblains. We have found no application more effectual in disposing the ulcers which follow burns to heal" (U S D, 1926, 316)

"The Compound Rosin Cerate, or Deshler's Salve, is used for the same purposes as the Rosin Cerate, but is somewhat more stimulating" (N S D 1916, 434)

Both cerates have been in use for more than a century and a half

It is interesting to note that the First Edition of the "First Pharmacopœia of the United States of America," published in 1778 ("First Century of the Philadelphia College of Pharmacy," 1922, 23, 10), recognized "Unguentum Basilicum Flavum," *Pharm Edin*. No formula was given

Apparently, the formula was that of the sixth edition of the Edinburgh Pharmacopœia published in 1756—the first issue prior to 1778, the date of issuance of the First Edition of the "First Pharmacopœia of the United States of America," used in Revolutionary Days—as the third and fourth editions, and probably the fifth, did not contain any formula for Unguentum Basilicum Flavum

Dr W B McDaniel, 2nd, Librarian of the College of Physicians, of Philadelphia, advises me (under date of July 28, 1933) that

"Bell & Redwood's Progress of Pharmacy in Great Britain (1880, pages 30, 31) gives the following notice of the editions of the Edinburgh Pharmacopœia 1699—1st ed, 1722—2nd ed, 1735—3rd ed, 1744—4th ed, 1756—6th ed, etc, to 1841. So, our 1735 edition, in claiming to be the third (wherein you found the formula) seems to be correct"

In the Library of the College of Physicians of Philadelphia, there is contained a copy of the 3rd edition of this work published in 1735, also a copy of the 6th edition of 1756. The 1735 edition recognized only Unguentum Basilicon, and the 1756 edition recognized Unguentum Basilicum, Unguentum Basilicum Flavum and Unguentum Basilicum Nigrum

Through the courtesy of the College of Physicians of Philadelphia, the following formulas from the Edinburgh Pharmacopœia are here given

#### UNGUENTUM BASILICON

R̄ Ceræ flavæ  
Sevi hircini  
Resinæ albæ  
Picis siccæ navalis  
Terbinthinæ Venetæ ana semilibram  
Olei olivarum libras duas cum semisse

(Directions for making the ointment are given in the formula in Latin J W E)  
(From *Edin Pharm*, 3rd Edition, 1735, 134)

(Directions for making the ointment are given in the formula, in Latin J W E)

(From *Edin Pharm*, 6th Edition, 1756, 133)

#### UNGUENTUM BASILICUM NIGRUM

R̄ Ceræ flavæ  
Resinæ albæ  
Sevi ovilli  
Picis liquidæ ana semilibram  
Olei olivarum sesquibram

(Directions for making the ointment are given in the formula in Latin J W E)

(From *Edin Pharm*, 6th Edition, 1756, 134)

#### UNGUENTUM BASILICUM FLAVUM

R̄ Ceræ flavæ libram unam  
Resinæ albæ sesquibram  
Olei olivarum libra una  
Terebinthinæ Venetæ semilibram

The Library of the Philadelphia College of Pharmacy and Science contains the 4th edition of the Edinburgh Pharmacopœia published in 1744 (as well as the 6th edition published in 1756), and its formula for Unguentum Basilicon (page 125) is the same as that of the 3rd edition published in 1735

Squire's Companion to the British Pharmacopœia (1916, 1155)—the latest edition published—gives the following formula for Unguentum Resinæ—Resin Ointment N O Synonym Basilicon Ointment (Modified) Resin, in powder 13, Yellow Beeswax, 13, Olive Oil (by weight), 13, Prepared Lard, 11 (The proportions in B P 1898 read 4, 4, 4 and 3)

Squire states, also (page 1155), that this ointment is recognized in the following foreign Pharmacopœias

Official in Austrian (Unguentum Basilicum), Yellow Wax 16, Olive Oil 36, Colophonium 12, Suet 12, Turpentine 12, Pitch 12, Dutch (Unguentum Resinosum Flavum), Yellow Wax 18, Colophonium 8, Sesame Oil 70, Turpentine 4, French (Pommade de Styrax), Purified Liquid Storax 16, Colophonium 29, Purified Elemi 16, Yellow Wax 16, Olive Oil 23, German (Unguentum Basilicum), Arachis Oil 9, Yellow Wax 3, Colophonium 3, Suet 3, Turpentine 2, Mexican (Unguento Amarilla), Yellow Wax 6, Colophonium 5, Suet 4, Acete 12, Norwegian (Unguentum Basilicum Nigrum), Colophonium 12 Yellow Wax 12, Pitch 12 Suet 12, Turpentine 12, Olive Oil 40, Portuguese (Unguento de Resina) Yellow Wax 25, Resin 25, Olco de Amendoin 50, Spanish (Unguento de Altea), Turpentine 50, Althæa Root 100, Water 100, Yellow Wax 160, Pine Resin 160, Olive Oil 750, Swedish (Unguentum Terebinthinæ Resinosum), Colophonium 15, Suet 15, Turpentine 10, Yellow Wax 15 Olive Oil 45, Swiss (Unguentum Resinosum), Colophonium 9, Turpentine 9, Yellow Wax 17, Olive Oil 65, U S (Ceratum Resinæ), Rosin 35 Yellow Wax 15, Lard 50, also (Ceratum Resinæ Compositum) Rosin 225, Yellow Wax 225 Prepared Suet 300 Turpentine 115, Linseed Oil 135

The official formulas for Resin (or Rosin<sup>1</sup>) Cerate, and Compound Resin (or Rosin<sup>1</sup>) Cerate since 1820 have been as follows

RESIN (OR ROSIN <sup>1</sup> ) CERATE												
	U S P 1820	U S P 1830	U S P 1840	U S P 1850	U S P 1860	U S P 1870	U S P 1880	U S P 1890	U S P 1900	U S P 1910	U S P 1920	
Resin	5	5	5	5	5	5	35	35				
Yellow Wax	2	2	2	2	2	2	15	15	15	15	15	
Lard	8	8	8	8	8	8	50	50	50	50	50	
Rosin <sup>1</sup>									35	35	35	

<sup>1</sup> The word Rosin is synonymous with Resin

COMPOUND RESIN (OR ROSIN <sup>1</sup> ) CERATE												
	U S P 1820	U S P 1830	U S P 1840	U S P 1850	U S P 1860	U S P 1870	U S P 1880	U S P 1890	U S P 1900	N F I V 1916	N F V 1926	
Resin	16	16	16	16	12	12						
Yellow Wax	16	16	16	16	12	12			22 5	22 5	22 5	
Suet	16	16	16	16	12	12			30 0	30 0	30 0	
Turpentine	8	8	8	8	6	6			11 5	11 5	11 5	
Linseed Oil	8	8	8	8	7	7			13 5	13 5	13 5	
Rosin <sup>1</sup>									22 5	22 5	22 5	

<sup>1</sup> The word Rosin is synonymous with Resin

There were no formulas for Compound Resin Cerate in N F I (1888), N F II (1896) and N F III (1906)

There is an ancient house on Market Square, in Germantown, Philadelphia—The Deshler—Washington—Morris House, built in 1772–1773 by David Deshler,

<sup>1</sup> The word Rosin is synonymous with Resin

"who had come here from Heidelberg, where his father, whose wife was a sister of Casper and John Wister, was an aide-de-camp to the reigning Prince," states Rev S F Hotchkins, M A, in his admirable history of "Ancient and Modern Germantown, Mt Airy and Chestnut Hill" (1189, 66)

David Deshler was "in successful business in Philadelphia 'As honest as David Deshler' was an old saying Mrs Deshler bought a salve from a butcher, which was called 'Butcher's Salve' and afterward 'Deshler's Salve' Dr Wister put the recipe in his Pharmacopœia" So, apparently, Deshler's Salve was known as early as the American Revolution, and in all probability it was used in Germany and Europe long before

Dr Hotchkins writes, also, that

"David Deshler dressed in olive colored silk velvet, with knee buckles and silk stockings, bright silver buckles and the usual three-looped hat—a custom that well became his handsome face and manly form His wife, Mary, was a granddaughter of Madam Mary Ferree a French Huguenot widow, who owned much land in Pequea Valley, where a Huguenot settlement arose, favored by the Indian King Tanawa She died in Revolutionary Days, but David, her husband, lived until 1792"

The Deshler Family of Germantown should not be confused with the Deshler Drug Store in New Brunswick, described by Dr F B Kilmer in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION of July 1929 Dr Kilmer writes me

"So far as I know this man and his store had no connection with Deshler's Salve, although among the laity and the druggists of New Brunswick they have erroneously been joined together Of course I am familiar with this Salve, I have made and dispensed it, but so far as I know the David Deshler of whom you speak was not in any way connected with the New Brunswick druggist"

## BINDING UP A WOUND \*

BY FRED B KILMER

When the dawn man swung from limb to limb in the primeval forest, crawled on all fours or walked upright, roamed in search of food and shelter, hunted, fished or fought his fellows, he got hurt In every move man made he was beset with bruises, cuts, stabs, scratches, bites, blows, breaks—injuries of many kinds The Stone Age brought axes, arrows, knives, lances, spears, clubs, hooks, tools and weapons of many sorts The Bronze Age, closely followed by the Iron Age, which extends to the present, added to and amplified the implemehts which would injure and maim man's flesh Every step in man's progress has brought new forms of injury, fire, the wheel, gunpowder, steam, the wagon, the engine, the machine, the motor, the aeroplane, electricity—and now in sight is radio power—atomic energy—all carrying elements for the mutilation of humankind Wherever man may go, whatever he may do, he is prone to get hurt In our highly civilized United

<sup>1</sup> Dr James W Wister of Germantown, writes me (August 12, 1933) that "All that you say concerning David Deshler I think is correct Dr Caspar Wistar, great nephew of John Wister, from whom I am descended spelled both his names with an 'a' The Doctor used the salve in his practice but so far as I know, was not the author of a Pharmacopœia"

\* Section on Historical Pharmacy, Madison meeting, 1933

States upward of nine million accidents occur every year Three million of them occur in the home

When primal man was maimed, instinctively he sought out a way to care for his wounds Out of this arose the healing art The first physician was a man of magic He dispelled demons and invoked angels with incantations, dances, rattles and the beating of drums With his potions and lotions he applied charms and amulets He made cures Somewhere from twenty to a hundred thousand years ago in caring for his wounds he washed them with water and, in turn, arrested bleeding with compresses and ligatures He preserved blood clots, a practice revived and renewed through the ages He covered wounds with moss, leaves and plant fibres He applied juices, decoctions, potions and lotions made from plants, poultices, fats, ointments, salves and cerates He made plasters of pitch and gums spread on leaves and skins He used wound-healing compounds made of ashes, balsams and animal excretions With flint lancets he opened congested blood spots, abscesses, and drained away pus With stone saws and knives he amputated limbs After the invention of the bone needle, wounds were sutured with animal threads The trephining operations of the Stone Ages would be a credit to the present-day practitioner An interesting feature of primitive surgical customs is revealed in figures of human hands imprinted on the walls of the caves of France and Spain wherein one or more joints of the fingers have been cut off as a religious and superstitious practice This custom was extended through the primitive people of many lands

In the Bible the use of roller bandages in fractures is referred to Among all ancient people wounds were dressed with "oil and wine" and balsams, and bound with bandages This custom is conspicuously delineated in the parable of "The Good Samaritan" In the Talmud, sutures and bandages are referred to, together with the freshening of the edges of old wounds to secure more perfect union Among the Hindus five to ten centuries before Christ surgical treatment attained a high point of development Their manuscripts describe a variety of surgical implements and important operative procedures They devised the bamboo splint centuries afterward adopted by the British Army They were skilled in the use of bandages, and taught the art of bandaging by applying them to plants, fruits, stuffed leather bags and even dead animals The student, at least, went through the motions

The Chinese from a very early period formulated intricate systems of anatomy and physiology which they applied to the cure of disease Religious tenets, however, forbade the shedding of blood and any cutting or mutilation of the body However, they did apply plaster compounds spread upon silk, skins, paper and other fabrics to open wounds and injuries

The Japanese, before they came in contact with European nations, followed the methods of China It was not until the nineteenth century that the modern period of medicine and surgery began in Japan

Ancient Egypt reached to high attainments in the arts only to meet with a lamentable decline The healing art was controlled by the priesthood and was guided by magic Disease was a kind of demoniac possession Injuries to the body were caused by agents from the invisible world Methods of treatment, even to the care for wounds, were carried out through charms and incantations to which were added material measures and remedies Practitioners were

highly specialized, each confining his attention to one disease or one part of the body. The physician who treated a cough could not be consulted in a backache. The man who treated a cut finger would not care for a cut nose.

Through the embalmer's art came a knowledge of anatomy. Translators have agreed that certain terms found in the records can be used interchangeably and made to mean "embalmer," "physician" or "surgeon." The Egyptian surgeon never cut through the unbroken skin. The initial incision even in venesection was performed by an embalmer who was thereby held in contempt.

The wound dressings of the Egyptians were quite extended and varied. In their use of substances which were antiseptic in action they antedated the practices hailed as discoveries in the nineteenth century. The bandages and wound dressing materials of the Egyptians were made of linen, animal skins, papyrus (paper like tissue) and the membranous omentum tissue of animals.

The various substances applied to wounds by the Egyptians included resins, balsams and gums, especially those from coniferous trees, oils of juniper and cedar, the ground wood of aromatic trees, powdered cassia, olibanum and myrrh, clays and the mud of the Nile (anticipating the later antiphlogistines), bitumen (the asphaltum of the Dead Sea)—the predecessor of the coal-tar products, dried lichens, including moss grown on the human skull. Resins, waxes and bitumen were at times applied boiling hot (cauterization).

From the embalmers came the art of bandaging and suturing (linen cord). Examination of mummies reveals their knowledge of many forms of bandages in use to-day. These include the circular, the figure of eight, the spiral, the "puttee" leg bandage, "finger cots." They covered wounds and packed them with pads of cloth and bundled cords. They filled them with resinous antiseptics like pastes and drained them. Bed sores were dressed with resin cerates spread on gargoyle's skin. Gold and silver plates were placed on wounds. This was a forerunner of our present-day application of gold and silver foil. For fractures, splints and stucco bandages were applied as supports. These latter were the equivalent of our present plaster of Paris splints.

Among the "lost Arts" attributed to the Egyptians may be classed some of their methods of applying surgical dressings.

In the "Iliad" of Homer we learn that warriors and, in some instances, women had a knowledge of wound treatment. The methods were simple, and evidently effectual. The effused blood was pressed out, the surface was washed with warm water, crushed roots or bruised leaves having styptic action were applied to check hemorrhage. Finally, emollients were applied and the part was bandaged. The surgical practice of the time is revealed in Hippocrates' "On Wounds, Fractures, Dislocations and Ulcers." Strenuous wrestling and athletic games provided ample practice in fractures, dislocations, sprains and strains. Slings, splints and bandages were used. Boiled water was used in cleansing. The importance of primary wound healing was known. Wounds were drained, and dry dressings were applied. Fomentations, poultices, washes, oils, cerates, ointments, liniments and plasters were employed.

In the passing of the centuries between Hippocrates and the dawn of the Christian Era Greek influence waned and became submerged in the Roman. We gain pictures of the medicine and surgery of the time through such writers as Cel-



sus, the voluminous encyclopedist who lived in the time of Tiberius Cæsar in the first century after Christ. In the second century A D came the immortal Galen, apothecary-physician who wrote five hundred treatises and whose influence held in the world of medicine almost if not quite to our time. Among the Byzantine scholars of the period was Paulus Eginata, who lived in the seventh century A D. Eginata was a surgeon and wrote accurately and with originality.

Surgery in Galen's time was medical. While the physician might care for an injury already present, he would not cut or incise. In this era and for centuries following, hemorrhage was checked by compression, and styptics, roasted resin flour and gypsum were applied. In aneurysm ligatures of thread and catgut were used. Tumors and cancerous growths were excised. Dressings were made of lint, used dry or wet with vinegar or wine, and changed frequently. Thus age and those which followed must have kept the apothecary busy in preparing plaster applications. The books enumerate many hundred formulas running from the lead and oil compounds—our diachylon mass—through innumerable mixtures, adhesive, vulnerary, desiccative, cicatrizing, emollient, anodyne, discutient, epispastic and suppurative plasters of countless sorts and kinds—to which were added poultices, oils, ointments, cerates, lotions and liniments.

With the rise of Arab power the works of the Greek fathers were translated and revised. The followers of Islam carried a knowledge of medicine, surgery and wound dressing to the remote parts of the known world. They introduced Eastern forms of bandages and dressings and the materials for their elaboration.

When Constantine placed the cross upon his banner—medicine—the Roman domination of the world of science, art, literature and trade waned. Medicine, surgery and wound treatment became Christianized. The monks practised medicine as a work of piety and charity, but ruled out surgery as a heathen art. They did, however, follow most faithfully the "Good Samaritan." They sought out the ill and injured, poured "oil and wine" over their wounds and carried them to the "Inn" of the parable, which was found at the gate of every monastery. This was the hospital of these ages. The nuns taught and practised the care of the ill and injured, as trained nurses do to day. They prepared bandages and dressing material for the wrapping of wounds, and supplied the crusading armies with outfits for the care of wounds and injuries on the battle field—the forerunners of the modern first aid packets and cabinets.

During the so-called "Dark Ages" medicine passed into the monasteries. Surgery was forbidden to the priests. Blood-letting, surgery and wound dressing were relegated to the "barbers." For many centuries practitioners of medicine held that surgical procedures were beneath them. They were forbidden to "soil their hands" in wound treatment. It is to the credit of the barbers that they created a class of "barber surgeons," some of whom reached to high attainment in the surgical art.

The passing centuries produced at intervals surgeons whose work is notable. At times there is seen dimly the foundation of the subsequent discoveries upon which modern surgery has been builded. In this period came Paracelsus, at one time a teacher of surgery at Basle. In the treatment of wounds he aimed at aiding, not combating, nature. To prevent putrefaction he applied substances which were essentially antiseptic.

Outstanding is the famous Ambroise Paré, the author of the classical exclamation, "I dress the wound, God heals it." He discarded the hot iron and boiling oil cauteries. He propounded the idea that pure air was beneficial in wound healing, that the impurities in the air were the source of putrefaction. Thus he combated with substances which were antiseptic.

Francis Arcaeus (1574) washed his wounds with alcohol, wine and myrrh, and introduced systematic drainage. From his efforts arose the 'balsam of Arcaeus' composed of suet, lard, resin and turpentine, applied on lint, an antiseptic dressing which remained for centuries.

A Holland scientist, Leewenhock (1675), saw dimly but unmistakably the microscopic bodies which we now know as bacteria, and laid the foundation upon which modern practice has been built.

A year later Robert Boyle announced his discovery of the nature of fermentations and propounded prophecies as to the subsequent advances in wound treatment.

A notable event in the history of wound treatment is revealed in the work of Sir John Coltbatch (1698), who in theory and practice anticipated the modern era. He used an antiseptic powder and devised that which would now be termed a typical aseptic course. Unfortunately, he kept the composition of his antiseptic a secret, and thereby became subject to the condemnation of his colleagues.

Among the practices of the seventeenth century was the 'sympathetic' treatment of wounds. Here the wound itself was washed with water and covered with a linen bandage. But to the weapon which had caused the wound a healing "sympathetic" compound was applied. Paracelsus originated a "weapon salve." Digby's "sympathetic powder" became famous.

The eighteenth century produced no marked advancement in the evolution of surgical dressings. Sporadically antiseptic substances for application to wounds were suggested, but were not generally accepted. Among these were sulphurous and lead lotions. In 1765 Pringle called attention to the use of cinchona bark as possessing the power of preventing wound putrefaction. This was later confirmed by several investigators and its use was carried down almost to our time.

It has been stated that medicine and surgery, including the art of wound treatment, "made more progress in the nineteenth century than in all the centuries preceding." It was in this century that the microbes which were the cause of disease, wound inflammation and suppuration were caught and convicted. The journey which led to the surgical revolution of this century was a long one. Finally, Pasteur showed that the fermentation of wine and beer was due to living organisms. The idea that suppuration in wounds and infective diseases were due to the same cause naturally followed. Out of this was born a new method of dressing and treating wounds—a new surgery.

*(To be continued)*

## GIFTS OF THE GODS TO PRIMITIVE MAN

BY JOHN THOMAS LLOYD

It has been said that every vegetable drug in our *materia medica* was first used in medicine by the aborigines. Perhaps such a statement is too all-embracing,

possibly a few were left for the white man to discover. But certainly in the New World, at least, the native people knew and employed as medicine the greater number of the indigenous drugs that are known to the white man to-day. But how, it may be asked, did the primitive and ignorant red men come into possession of such broad knowledge of the medical flora, and why, if they knew so many drugs, do we not have greater knowledge of their manner of employing them? In tracing an American drug to its first records, why do we usually find the bare statement that "it was first used by the Indians," with no explanation as to whether it was used as powder, infusion or decoction, strong or weak? Why were their pharmaceutical methods, necessarily primitive, not more frequently recorded?

In the *National Eclectic Quarterly*, September 1921, my opinion was expressed regarding the probable manner in which the Indian gained much of his knowledge of medicinal plants. I will here briefly remind the reader that the white man's systematic knowledge of medicine, since the days when he relied more upon pure sorcery and witchcraft than upon observation of drug action, dates back but a few generations—or a few centuries at most. The Indian's knowledge, though often mixed with sorcery, was acquired through intimate association with Nature from the day of his earliest impressions to the day of his death. His very existence depended upon his knowledge, not only of what was good and palatable food in times of plenty, but more upon what roots and seeds could be eaten in times of scarcity. In trying all, as he must have done to carry him through times of famine, or to add variety to a monotonous diet, it is small wonder that he detected and came to recognize plants that produced unusual sensations or that relieved ailments from which he suffered.

Unfortunately for the preservation of records of the Indian's use of medicinal plants, his magic and therapeutics are often so intimately associated that it is impossible for us to separate the practices founded on true observation of results from those founded on pure superstition. Magic and medicine to him were almost or quite synonymous. In his language both are expressed by a single word—a word that differs but little from our own word, *prayer*. On this account it is a common inference that his ignorance is sufficient cause to disqualify the drug he used.

On our western desert, late summer dances with snakes and drums and grotesque masks may be serious petitions for the ending of drouth. In eastern forests singing medicine men with wolf-like masks may administer *Podophyllum* root from a plant that was approached from the east, encircled three times and finally red beads dropped in the holes from which the root was dug. Superstition this may seem to us, but to the Indian it is prayer to the Divine Power as serious as if the shaman chanted in an atmosphere of incense while robed in sacred vestments in place of animal masks and skins. If physic followed the administration of the *Podophyllum* it clearly indicated that the invading disease-causing demon was expelled by the ceremony, just as rain following the snake dance indicated that the gods were pleased and granted the appeal for moisture.

One can learn but little of the ways of the Indian without realizing that every act was interwoven with charm and fetish. The sowing of corn was preceded and accompanied by dance and ceremony lest the grain blast and wither. The gathering of the crop was accompanied by ceremony of thanks and rejoicing.

"Once when all the maize was planted,  
 Hiawatha, wise and thoughtful,  
 Spake and said to Minnehaha,  
 To his wife, the Laughing Water  
 You shall bless tonight the corn-fields,  
 Draw a magic circle 'round them,  
 To protect them from destruction,  
 Blast of mildew, blight of insect "

While the hungry tribe looked on and waited, the first ears from the fire were ceremoniously sacrificed to the gods

Even the personal doings of the Indian were governed by charms and magic. There were charms to turn arrows, charms to protect the traveler, charms for the safety of those left at home. For the Indian there were no natural laws to account for that which the brain could not comprehend. The sun, the stars, the earth, the waters, health, disease, famine—all were mysterious gods, or the gift of gods whose favor must be courted or wrath appeased, by the proper magic or medicine.

Probably it is fundamentally on account of the white settler's lack of sympathy and understanding of these Indian superstitions that so little of what he knew and did is now known. The early missionaries found the native ceremonies (strange mixtures of empirical learning and pure superstition) in conflict with their teachings, so drove them to seclusion. The less serious-minded trappers and traders often found the dances and rituals mirth-provoking. Quite naturally neither gained the confidence of the proud first Americans.

Even to-day there are men of science who question the worth of a medicine that originated with the ignorant and superstitious savages. These men seem to lose sight of the fact that the dance for rain comes in the late summer just before time for the desert to blossom, and the administration of *Podophyllum* accompanied the ceremony to drive away the demon of disease. "We must admit," says James Mooney, "that much of their practice is correct, however false the reasoning by which they have arrived at their results."

The dance to the gods was considered as important at seed-time as the planting itself. Yet do we say that corn is worthless? Has the white man with all his knowledge of plant breeding ever bred products of greater value than corn, potatoes, tobacco, beans, squash, pumpkin, peanuts, or has he induced plants to progress farther from their primitive ancestry than these plants have progressed under the influence of pagan superstition and worship?

If at first thought one believes the aborigines, without laboratory facilities and without technical training, could make no discovery that would stand the test of the modern physiological laboratory, let him consider the early uses of almost any of the vegetable drugs classed as habit-forming stimulants or narcotics. Nicotine, for example, occurs, with but one known exception, in plants of the genus *Nicotiana*. The exception is the Australian plant, *Duboisia Hopwoodii*. Curiously enough the leaves of *Duboisia* are chewed by the Australian natives in much the same way that tobacco is chewed by its addicts. Yet the effects of nicotine are so imperfectly understood that there is more than a little doubt in scientific circles as to whether it contributes any important part to the pleasure of the tobacco user.

Another example is the well-known water-soluble alkaloid, caffeine. Caffeine, as we all know, is a stimulant so mild that its exhilarating effects pass almost or

quite unnoticed. It cannot be detected by flavor for it is practically tasteless. Caffeine occurs in comparatively few plants, among which the best known are tea, coffee, cocoa, kola, maté and guarana. These plants are of dissimilar appearance and are native to widely separated parts of the earth, yet every one of them was independently discovered by primitive man, and those on the American continent, at least, are prepared by their discoverers with pagan rituals. Civilized man isolated the alkaloid, caffeine, thousands of years after primitive man discovered its source and uses.

Is one to believe that the savages subjected every plant to tests careful enough to disclose the mild effects of caffeine? Stupendous as such a task would prove, is it not difficult to understand by what other means the caffeine-bearing plants could have been discovered among the thousands of dissimilar forms of vegetation? And, is it not logical that the process which made them known would also reveal other plants with other medicinal qualities? Should even the most technically trained persons question the worth of any medicine solely because it was first employed by the savage? If this logic were applied to foods, what dishes would appear on our daily table?

Not only have native tribes discovered medicinal plants, but they have discovered even more remarkable manipulative processes which make useful qualities available, or hold in check qualities that are detrimental, or alter drug structures to develop qualities that are not present in the natural state. This is pharmacy of the highest order. It antedates pharmacy of the European civilized nations by untold centuries.

To illustrate we need but consider a few of the caffeine-bearing plants already mentioned. Of these, tea leaves undergo careful "curing," while coffee, guarana, cocoa and kola are subjected to roasting before they are fit for use. In addition to roasting, cocoa also undergoes a period of fermentation.

Tobacco likewise must be cured before there is the slightest suggestion of the aroma that has perfumed the atmosphere of all civilized countries since Sir Walter Raleigh smoked the Indian weed to the astonishment of Queen Elizabeth.

Coca, the plant from which cocaine is derived, has been so long under Indian cultivation that the wild plant from which it descended can no longer be determined. In using coca, lime is invariably mixed with the leaves. Under its alkaline influence the alkaloids of the plant are insoluble, which suggests doubt whether "coca chewers" are in reality "cocaine eaters."

Several of the plants named are among our most important economic products. Great industries in every civilized country are founded upon their production and distribution. Yet, in their natural state, they are absolutely unfit for use. There is nothing about them that could possibly indicate that aromas and flavors could be developed and their natures completely altered by processes of roasting or curing. Had the discovery of their hidden qualities and the pharmacy necessary to bring them out been left to the white man, it is doubtful whether one of them would to day be of more than taxonomic botanical interest. The pharmacy of the aborigine discovered and developed hidden qualities of natural vegetable products just as his plant and animal breeding developed foods without which man would necessarily be dependent upon wild things for sustenance, and his crowded civilization would be impossible.

AN OPPORTUNITY AND A CHALLENGE TO PHARMACY  
EDUCATORS \*

BY HENRY J GOECKEL

The reports of the Committee on the Costs of Medical Care suggest that the public must choose between the socialization of medical care with its bureaucratic regimenting and inflexibility, or that private service must be developed to be more effective and more economical. The trend of the report is an accusation that the affective value of the service is not commensurate with the cost of the same.

Pharmacists may well be pleased with this report in its statement that as instituted "the services of the pharmacist are readily available to the public without unduly high cost for the prescribed medicines" and in the recommendation that "the preparation, standardization and distribution of drugs, medicines and medical supplies should be limited as far as possible to pharmacists who are prepared by education and training to render this responsible service and to protect the public against abuse."

As affecting pharmaceutical education we find

- 1 That more stress should be placed on the pharmacists' responsibilities and opportunities for public service,
- 2 There are enough if not more than enough colleges of pharmacy teaching under graduate courses but there are very few giving graduate work,
- 3 The education should be more closely correlated with the education in other public health professions

In the past years the member presenting this paper has introduced different phases of two fields for pharmaceutical endeavor sadly neglected by the profession in America—two phases which have much to do with meeting the issues raised by the report of the Committee on the Costs of Medical Care.

The first of these is "Hospital Pharmacy" which happily is on the road to correction by the recognition of the needs for adequate pharmacy service in the hospitals and by the inclusion of a clause to that effect in the standards set by the Council on Medical Education and Licensure, of the American Medical Association.

The second subject, that of clinical laboratory service, is now of more vital interest and importance than ever for the following reasons:

- 1 The days of the side line expansion and diffusion of the upkeep or cost of pharmacy establishments has reached a point where it has not only ceased to be an aid to rendering of pharmaceutical service but has become much of a discredit and a detriment to the profession of pharmacy. Many of these activities now so overshadow true pharmacy as to be injurious to the public interests,
- 2 The recognition of pharmacy's place in the hospital group makes it imperative that our pharmacy faculties take steps to prepare pharmacists and pharmaceutically educated personnel capable of filling these positions efficiently,
- 3 The reorganization of pharmacy education to a full four-year undergraduate course puts the challenge to these faculties to shape graduate courses to meet the advances in pharmacological medical practice in keeping with the times.

Many phases of this subject have been brought to the attention of the members of this ASSOCIATION during the past fifteen years.

---

\* Section of Education and Legislation A. P. H. A. Madison meeting 1933

In 1919, a paper was read before this Section on "Pharmaceutical Education and Opportunities"<sup>1</sup> to focus attention upon the subject of clinical pathology and its relation to pharmacy. It endeavored to show that it is a branch of the medical arts and sciences which requires a greater chemical and pharmaceutical knowledge than is required for the practice of general medicine and surgery. That it should, therefore, be classed in the group with pharmacal medicine along with pharmacology and pharmacy proper, and should receive greater consideration by colleges of pharmacy giving advanced courses.

In 1921, before the Section on Practical Pharmacy and Dispensing, a paper was presented on "Clinical and Pathological Laboratories—Their Maintenance, Service Charges and Scope of Work."<sup>2</sup>

In 1925, a paper on "Combined Pharmacy and Clinical and Pathological Laboratory Education"<sup>3</sup> was presented before this Section. This reviewed and discussed the various combined courses for medical students and particularly discussed and questioned the value of the course combining pharmacy with medicine offered by the University of Michigan.<sup>4</sup> It also dwelt upon factors pertinent to the costs of medical care, the economic factor of the high cost of medical education and training in dollars as well as in the important sociologic factor of the many unproductive years of the physician's life, and it questioned the value of much that is crowded into the medical curriculum. The paper called attention to the loss to society if the so called preclinical courses of the medical curriculum were further curtailed and the detrimental effect of this on the laboratory branches if no other arrangements are made to preserve these utilitarian subjects to society.

It pointed out that the pharmacy faculties in university schools are the logical ones to take the initiative to develop these branches. In contrast to the students of medical schools it will be found that the students who enter a first-class pharmacy school for the more extended courses are of a temperamental and mental type which makes for success in the tedious work which characterizes most laboratory activities.

Likewise, the grilling chemistry and related courses as given in the pharmacy school are more directly applicable for this type of work than are the very limited courses given to prepare medical students or the general chemistry of many universities. To properly qualify advanced pharmacy students to become expert in the clinical laboratory service requires careful planning and selection of courses.

The experimental physics courses for such students should be extensive. Where a comprehensive general biology course and an extended experimental pharmacology course are available, the anatomy and dissection courses of the medical school are not necessary as the laboratorian of this type does not need the regional precision in human anatomy required of the physician or by the surgeon.

The bacteriology should be developed in the pharmacy school, as a much more extended course should be given than is required in medical schools. The tendency in recent years has been to abridge the normal and pathological histology courses in the medical schools. For this reason and for the needs of pharmacological research

---

<sup>1</sup> H. J. Goeckel, *JOUR. A. PH. A.*, 8 (1919), 930.

<sup>2</sup> H. J. Goeckel, *Ibid.*, 10 (1921), 132.

<sup>3</sup> H. J. Goeckel, *Ibid.*, 14 (1925), 48.

<sup>4</sup> Edward H. Kraus, *Ibid.*, 13 (1924), 353.

training it will be advisable for the schools of pharmacy to develop their own courses in these subjects. Much experimental animal histology and phases of drug action and toxicity can thereby be stressed. The general embryology in the general biology is ample because the pharmaceutically trained student is well versed in plant histology and plant embryology.

In the 1925 paper, the view was expressed that the clinical pathology course of the medical school would possibly be better than a course at the pharmacy school. My experience since then and the advancement in the pharmacy curriculum lead me to decidedly revise this view. The courses at the medical school are probably adequate for medical students but they are far from satisfactory to prepare laboratory experts. The subject will have to be developed by the pharmacy school and correlated with the courses in bacteriology, histology, pharmacology and physiological and organic chemistry.

Placing this branch of laboratory service in the pharmacal group and preparing a truly qualified group of laboratorians will tend to prevent the laboratories of our hospitals being used as a makeshift by physicians until the opportunity presents itself for them to enter general practice. This is one of the banes of the laboratory service, as comparatively few medical men take up the service with the serious intention of making it their life's work. The result is that they usually employ it as a stepping-stone and never thoroughly qualify or devote their attention to the work.

The greater part of this work is at present in the hands of mechanically trained technicians. Every community with two or three "real" physicians can support such a laboratory organization. By "real" physicians I mean the general practitioner who makes thorough and careful examinations of his regular patients and keeps careful cumulative histories on each one, in distinction to the type which I call a "Medicine Man." This will furnish the means for the "real" physician to get reliable aid to alter, to extend or to refute his tentative diagnostic conclusions, and also aid in checking up on case progress. It will place in each community a unit which many times furnishes the key to the physician in deciding whether or not to send the patient to a consultant, to a specialist or to a hospital.

It will greatly aid the medical profession to meet the challenge of socialized medical care with its roseate promises and its inherent evils.

As affecting the laboratory service

It will place the service in a distinct class where it will not be subject to the abuse of being utilized as a mere stepping-stone to medical practice.

Through having thoroughly educated and trained expert laboratorians the service will be greatly improved and extended.

It will afford a better means of establishing efficient hospital service than is at present possible.

It will help to coördinate the medical, surgical, nursing and pharmacy service of the institutions.

This combined pharmacy and clinical laboratory education is one in which the subjects supplement and fortify each other and thereby greatly extend the value of the laboratory units.

As affecting pharmacy

It is the one specialty which coördinates all other types of pharmacal service and is the only field giving direct sympathetic contact with the physicians.



It can be combined with professional pharmacy to pharmacy's and to the public's advantage as it will afford opportunities to detect the shortcomings of the pharmaceutical services

It makes possible the maintenance of laboratories in smaller communities and enables these specially qualified pharmacists to take advantage of their analytical training in chemistry and in the other branches of the pharmaceutical field

Such laboratories can at times take over the routine control analysis of smaller industrial establishments Where it is combined with a pharmacy this will often become a special purchasing unit of the industrial establishment thereby increasing the volume of business in rapid turnover items It will often be the local health control unit thereby extending pharmacy's public health service capacity Most physicians in the writer's service submit the diagnostic nose and throat swabs in suspected diphtheria cases to him and his associate and then send the release cultures to the State Laboratory

This education and training will provide a more satisfactory group of pharmaceutical chemists for teaching and for manufacturing and for biological positions As specifically affecting the public

It will improve and spread the laboratory service and by its coordinating effects it will improve medical and pharmaceutical service

It will extend pharmacy's control right to the use of the medicaments

The writer is many times sought by and goes into conference with his medical clients in selecting the remedial measures to be employed in given cases He is repeatedly requested by many physicians to criticize their therapeutics when the laboratory examinations indicate errors or abuse

By this advance the pharmaceutical profession can pledge still greater advances in the value and quality of the pharmaceutical services beyond that disclosed by the very favorable report of the Committee on the Costs of Medical Care

The challenge is up for the pharmaceutical faculties of America to make this come true

---

#### ABSTRACT OF PAPER, SCIENTIFIC SECTION, A PH A

"Two Species of the Genus *Ledum*," by Russell A Cam and E V Lynn—A preliminary study of *Ledum groenlandicum*, Oeder having shown very interesting composition, a more extensive investigation was made of the leaves and of the flowers of this and of *L. columbianum* Pip After a partial proximate analysis, during which the absence of alkaloids was noted, the volatile oils were more carefully examined The fresh leaves of *L. groenlandicum* yielded 0.12 to 0.18 per cent of oil which was found to contain about 25 per cent of *l* borneol, partly as acetate, 25 per cent each of *l* alpha phellandrene, *l*-alpha-caryophyllene and ledum camphor, a smaller quantity of phenols, chiefly carvacrol, some free acetic acid and possibly other acids of higher molecular weight, probably some azulene The fresh flowers gave 0.058 per cent of oil which had strikingly different constants The fresh leaves of *L. columbianum* yielded 0.55 per cent of oil containing about 3 per cent of *l* alpha-pinene, 15 per cent each of *l* borneol, partly as acetate, ledum camphor and an unidentified terpene, probably *l* beta pinene, 10 per cent each of *d*-alpha phellandrene, *l* alpha-caryophyllene and columbenol, a stearoptene, probably  $C_{16}H_{22}O$ , a small amount of phenols, chiefly carvacrol, some free acetic acid and possibly traces of other acids of higher molecular weight, probably some azulene The fresh flowers gave 0.59 per cent of oil with notably different constants

Contrary to previous opinions none of the overground portions of either plant was found to be poisonous to animals, even when given in enormous doses No evidence could be found for the presence of arbutin, which had been claimed as a constituent of *L. groenlandicum* The glucoside, ericolin, may be in the leaves of both species, as attested by hydrolysis to ledum camphor, but since no one has ever isolated the glucoside in a pure state from any vegetable source, one can conclude only that there is present in the species of *Ledum* a substance which hydrolyzes to ledum camphor

# THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE, A A C P, EDITOR OF THIS  
DEPARTMENT

The following papers "Why Organic Chemistry Should Be Taught in the School of Pharmacy" by Dr C J Klemme and "What the Department of Pharmacy Expects of the Department of Chemistry" by Dean H C Newton, are worthy of careful perusal by all teachers of pharmacy and pharmaceutical chemistry. The arguments that Dr Klemme sets forth for the teaching of organic chemistry by an individual prepared in pharmacy are to my mind irrefutable provided of course, the individual is a well trained organic chemist and a good teacher. That the department of pharmacy should expect cooperation, sympathy and understanding of the problems of pharmacy by the department of chemistry is to be expected by all and Dean Newton has summed it up very well in his conclusion which is found at the end of his paper.—C B JORDAN

## WHY ORGANIC CHEMISTRY SHOULD BE TAUGHT IN THE SCHOOL OF PHARMACY

BY C J KLEMME

The subject of this paper has been limited to the question of teaching organic chemistry in the school of pharmacy because, although the same question might arise in connection with other branches of chemistry, organic chemistry seems to be more vitally linked with the substances composing our *materia medica*.

The department in which organic chemistry is taught and the type of course given in the various schools of pharmacy depend upon several factors, among which we might consider, as the most important, the attitude of the school authorities and the physical structure of the school. However, the discussion in this paper will be limited to reasons for advocating the instruction of organic chemistry as an integral part of the work done by the school of pharmacy and not that of an extraneous department.

It is true that the fundamental principles of organic chemistry are the same in any course on that subject, but any teacher dealing with this course knows that certain phases may be stressed or slighted according to the needs of the student. It is obvious that the needs of students in pharmacy, chemical engineering, home economics and chemistry as a major differ to a considerable extent. The chemical engineer is interested only in fundamental principles and their applications and not specific details of any particular class or classes of chemicals, for he knows not what field of endeavor he will encounter upon graduation. The home economics student is interested primarily in food stuffs, textiles and perhaps dyes to a limited extent. The student majoring in chemistry requires a knowledge of reaction mechanism, atomic and molecular structure, and the application of physico-chemical methods to the synthesis and analysis of compounds. The pharmacy student must concern himself with not only the fundamental principles of organic chemistry in general but also the properties of specific classes of substances with which he will come in contact during his career.

It might be well to point out a few examples of phases in organic chemistry which, the author feels, the pharmacy student should be taught, and which are not given sufficient weight in what we might call a general course.

The U S P directs that "ether to be used for anesthesia must be preserved only in small, well-closed containers, and is not to be used for this purpose, if the original container has been opened longer than twenty-four hours " No reason is given for this caution, but if an instructor in organic chemistry discusses the formation of peroxides along with possible effects of these substances, the reason for such strict caution is immediately explained

The U S P states that "chloroform contains not less than 99% and not more than 99.5% of  $\text{CHCl}_3$ , the remainder consisting of alcohol " Why the presence of the alcohol? Why not some other substance? Is the alcohol an impurity or does it have a purpose? In the discussion of chloroform in the chemistry class, the instructor should explain the decomposition of chloroform into  $\text{HCl}$  and phosgene, and tell of the use of ethanol as a negative catalyst in this decomposition The same explanation would apply to the use of methanol in formaldehyde to prevent polymerization He should also tell why chloroform to be used for anesthesia is prepared from chloral and not by other methods

In a general course in organic chemistry, the modern synthetic medicinals receive but scant attention Due to the increasing use and value of these drugs, a pharmacy student should acquire a fairly comprehensive knowledge of their preparation and properties The least that could be done in any course is to outline the method or methods by which some of these compounds are actually prepared instead of giving a purely theoretical method, which, when put into practice, affords a very small yield A particular case along this line is that of phenyl-barbital

Of considerable interest to the student in pharmacy is the relationship between chemical structure and pharmacological action We must admit that knowledge along this phase of the work is meager in the extreme and yet there are some very interesting points in this relationship which might well be brought to the attention of the student

Alkaloids are passed over in a general course usually with an inadequate definition and a statement to the effect that they are rather heterogeneous and complicated Yet to the pharmacist, these are tremendously important substances Glycosides might be similarly cited When the pharmacy student has not received adequate instruction in the glycosides, he finds himself at some loss in the study of materia medica where he discovers that so many drugs contain one or more glycosides as active principles

There are other special classes of substances we might mention, such as the dyes and stains, volatile oils, waxes, etc., which do not receive the attention that should be given to them by a student of pharmacy when he takes a general course The reason is natural and obvious Many of these substances are not members of the great classical groups of organic compounds, but come under general headings of compounds containing two or more functional groups The chemical engineer, the home economics student and the biology student are not seriously concerned with them, but to the pharmacist these substances constitute a group with which he should have more than a nodding acquaintance

The author has been able to follow the progress of pharmacy students under both systems of teaching organic chemistry and it is his firm belief that wherever the physical set-up makes it possible in a university, organic chemistry should be

taught to the pharmacy student in the school of pharmacy and by an instructor who has graduated in pharmacy. Such an individual is in a position to know the exact needs of the student and can supply those needs to the furtherance and betterment of the student's education.

---

## WHAT THE DEPARTMENT OF PHARMACY EXPECTS OF THE DEPARTMENT OF CHEMISTRY

BY HOWARD C. NEWTON \*

"Blessed is he who expects nothing  
for he shall never be disappointed "

It must have been these words of Alexander Pope, written in 1727 in a letter to Gay, which inspired the answer of my friend, a teacher of Pharmacy, to my question, "What do you expect of the Chemistry Department?" He replied, pessimistically, "I expect nothing, so that anything I get will be better than I expected." However, this is not the unanimous answer to the question. Far from it. Another Pharmacy teacher replied, "I expect much of our Department of Chemistry and it always more than meets my expectations." Thus we find the two extremes and doubtless the true answer lies between them.

Realizing the difficulty in obtaining an accurate consensus of opinion on the subject of this paper, I decided to render my own opinion on it and, thereby, provide material for criticism and discussion in this Conference. In order that you may "read between the lines" more readily, I will state that my opinion is based on some twenty years of experience in Departments of Pharmacy, several of these years in an executive capacity, and on a recent study which I have made in the field of pharmaceutical curriculum construction. I am bringing to you who are teachers of Chemistry, therefore, the opinion of one who lives on the pharmaceutical side of the fence, if there is a fence between the two departments (which I doubt).

The expectations of the Pharmacy Department with respect to the Department of Chemistry, may be classified in two divisions—those which are more general and might apply properly between any two departments, and those which are specifically applicable to these particular departments of our discussion. I shall speak of the general expectations first.

The Department of Pharmacy, first of all, expects the Department of Chemistry to cooperate actively with it in doing everything possible for the present and future welfare of the student who is being educated and trained for the practice of some phase of Pharmacy. I purposely emphasize the welfare of the individual student—the individual Pharmacy student, because his interest should be the paramount interest of the two departments. His success in his chosen work is perhaps an approximate measure of the quality of the instruction he receives.

When a student enrolls in a college of Pharmacy, he does so, I believe, with the feeling that his curriculum is one that has been carefully constructed and coordinated for the purpose of preparing him for the practice of pharmacy. He has no reason to suspect that any department with which he comes in contact in his

---

\* Creighton University, Omaha, Nebr. 1933

training shall consider him as a necessary nuisance. Nor does he anticipate that a department shall consider his application of its subject to Pharmacy any less inspiring, any less dignified, and less contributive to the public well-being, than the same subject as applied by students in Engineering, in Dentistry or in Medicine. To him there are no barriers between departments, they are all working together to educate and train him to become a successful pharmacist. The college catalogs and bulletins support him in this belief. And this is as it should be. However, this fine assumption will be dispelled very quickly unless there is active cooperation between departments.

A sympathetic consideration of the chemical problems of the pharmacy student, an inculcation of respect for the pharmaceutical applications of Chemistry, an evident recognition of the close relationship of Chemistry and Pharmacy—these constitute an important part of what I mean by active cooperation between the two departments.

In the matter of character training, the Department of Chemistry is in a strategic position. In the curricula of nearly all of the colleges, more time is devoted to laboratory work in Chemistry during the first year than to any other subject. This offers a real opportunity to the Department of Chemistry to establish rules of procedure in the laboratory which will train the student in those high ranking traits, or characteristics, of cleanliness, neatness, business-like attitude, accuracy, promptness and confidence in one's own work. I have found that when the development of these traits is emphasized in the work of the student during the first year in the Department of Chemistry, the procedure in the laboratories of the Department of Pharmacy during subsequent years is highly satisfactory to the student and to his instructors. On the other hand, if at the beginning of his laboratory work the student is allowed to be slovenly, to be inaccurate in his measurements, to use poor technique in manipulations, and to rely on his neighbors for confirmation of his results, his progress in the laboratories of the Department of Pharmacy is likely to be a stormy one. It is, of course, the old story of getting a good start and it falls to the lot of the Department of Chemistry to start Pharmacy students in their laboratory careers. For this reason, the Department of Pharmacy expects the Department of Chemistry to have established a routine procedure in its laboratories which shall aid in the development of those traits mentioned which are so essential to the success of the practicing pharmacist.

The final expectation of a general nature which I shall mention is one which is so obvious that it sometimes suffers neglect. The Department of Pharmacy expects the Department of Chemistry to employ educational principles which result in true learning on the part of the student. Herding large numbers of students gathered from all quarters of the campus into an auditorium to listen to lectures of a learned man whose chief interest is not in his lectures, or into a laboratory supervised only by students, is not, in my opinion, employing such principles. Sound pedagogy in all departments is the rightful expectation of the student, educational procedure which results in true learning is the rightful assumption of each department of the others.

Now, turning to some specific points of information and skill which are expected to have been developed by the Chemistry Department, I have made diagrams indicating the general plan of the courses in the departments of Chemistry

and Pharmacy in our College. You may not agree with the particular nomenclature used or with the sequence indicated, but such divergence of opinion will not affect this discussion. What I wish to demonstrate is the dependence of courses in the Department of Pharmacy on courses in the Department of Chemistry. Granting this dependence, one must admit that the Department of Pharmacy logically expects certain information and skill derived by the student from his courses in the Department of Chemistry.

It is brought out rather forcibly from these diagrams that the Department of Pharmacy draws heavily from the Department of Chemistry for specific points of information and skill. As an example, in dispensing a solution of silver nitrate, much of the necessary information comes from the course in General Inorganic Chemistry. Again, in preparing prescriptions containing acetylsalicylic acid, the information is drawn from the course in Organic Chemistry. Likewise, in manufacturing preparations of bismuth, much of the information is drawn from Analytical Chemistry both Qualitative and Quantitative. And so, on and on, such simple examples of the reliance of the Pharmacy Department on the information furnished the student by the Chemistry Department are typical, while many more complex examples could be given, such as the "adjustment of solutions," where, in dispensing, some definite information and skill involving Chemistry is very necessary for solving the particular dispensing problem.

Because of the limited time at my disposal, it is not my purpose to indicate the specific information and skill expected of the Chemistry Department by the Department of Pharmacy, but, rather, to bring to your attention that which you all know but to which, possibly, you have not given much thought—the great responsibility which the Department of Pharmacy places on the Department of Chemistry.

In conclusion, then, I shall summarize this brief expression of my opinion of what the Department of Pharmacy expects of the Department of Chemistry as follows:

1. An active cooperation with the Department of Pharmacy for the ultimate benefit of the student.
2. The development of those traits in the student which have been found to be so essential to the success of the practicing pharmacist.
3. Teaching technique of a high order which results in true learning.
4. A fund of basic principles, specific information and skill inculcated in the student for application in the courses of the Department of Pharmacy.

I realize that I have placed my expectations high but my experience has indicated the possibility of their fulfilment.

I salute the Department of Chemistry as the foundation upon which the Department of Pharmacy has been enabled to build its towers of progress.

---

*A Ph A Resolution No 13 Official Recognition of the Pharmaceutical Syllabus*

Resolved, that we express our appreciation of the work of the National Pharmaceutical Syllabus Committee culminating in the publication of the Syllabus for the four year course in pharmacy and that we concur in the recommendation of Chairman J. G. Beard of the Syllabus Committee to the effect that the Syllabus be given official recognition by colleges and boards of pharmacy.

## THE RELATIONSHIP OF PRESCRIPTION INCOMPATIBILITIES\* TO PHARMACY

BY LEON W RICHARDS

Just what is the true relationship of prescription incompatibilities to the present-day pharmacist? If catalog descriptions and A P H A convention discussions are to be taken as true indications of the materials taught in the various dispensing departments, the subject of prescription incompatibilities occupies a place of importance in most colleges of pharmacy. In the way of illustration, a catalog description of a three-credit two-semester dispensing course of a certain college is given as follows: "A comprehensive study of the incompatibility and the compounding of medicinals, with regard to dosage, physical, chemical and therapeutic incompatibilities." Such emphasis on incompatibilities apparently is not the exception but rather the rule in dispensing classes of to-day.

The question arose as to whether the value of this knowledge of prescription incompatibilities warranted the time and money spent on this subject. In seeking to answer this question, a number of owners of both professional and commercial drug stores were interviewed as to their experiences and opinions. Their reactions indicated one of two things to be true, *first*, either the subject is overemphasized, or, *second*, the teachers have failed to get a working knowledge of the subject across to the students.

The dispensing pharmacists seem to be mildly unconcerned relative to this entire subject. Several factors influencing this present-day indifferent attitude are, *first*, the new type of to-day's prescription, *second*, the difficulty involved in making a change in an incompatible prescription with the whole-hearted consent of the physician, *third*, the vagueness in the minds of the graduating students concerning the subject, and, *lastly*, the relative infrequency of incompatible prescriptions.

There has been considerable change in the types of prescriptions in the last fifteen to twenty years. The art of compounding, though broader in scope, is less complex than of former times. It is an accepted fact that the day of the so-called "shotgun prescription" is past and the tendency is toward simplification. Nowadays the doctors are constantly being detailed on this and that specialty. The figures of the "St. Louis Drug Store Survey" clearly show the natural result from this practice. It was found that a total of 35% of all prescriptions contain only one ingredient and the average for all prescriptions surveyed contained only 2.4% ingredients, which is astonishingly low as compared to the ten and fifteen components of not so long ago. Obviously, these simplified prescriptions have greatly reduced the number of cases of incompatibilities, a fact which most assuredly has an important bearing on this subject.

Moreover, with the advent of this new type of prescription, there has come an increasing use of the proprietary remedies which has added more confusion to an already difficult subject. The very nature of these preparations limit the compounder in applying his knowledge in instances of incompatibilities. Of course he knows the general nature of these materials but in the end he usually is forced to add a shake label and dismiss the case.

---

\* Section on Practical Pharmacy and Dispensing, A P H A, Madison meeting 1933

Now as to the difficulty involved in changing incompatibilities in physician's prescriptions one finds quite another problem. The suggestion is always made to the dispensing student that he get in touch with the doctor and they correct the difficulty together. This theoretical plan is difficult to carry through to a satisfactory close. A number of physicians resent this attitude of the pharmacist and insist that the prescription be dispensed as written. Such a condition necessarily fosters the shake label remedy and cannot help but have a derogatory influence on future practices. If the druggist proceeds to the correction without this consultation, which many are doing, there are the self-evident encumbering difficulties. However, there seems to be no acceptable solution for this situation and the problem is most frequently settled with the already over-exercised "shake" label.

In the third factor, which pertains to the vagueness in the minds of the graduating student concerning this complex subject, one encounters a vital question. As a student, he is instructed in the various types of incompatibilities possible and he learns there are a number of general rules as to how groups of substances may or may not react. Then he learns of the exceptions to these rules, and then possibly the hundreds of special cases are brought to his attention. In the end he endeavors to correlate his qualitative chemistry, his general pharmacy, etc., to the point of recognizing and correcting these hundreds of possible incompatibilities. Time will permit him to investigate at first hand only a very few examples of this broad field. The neophyte becomes more or less imbued with the subject and graduates expecting to plunge into incompatibilities by the score, but, as a matter of fact, he meets very few.

This brings up the last point involved, that of the infrequency of occurrence. The average pharmacist, through lack of application, soon forgets his heterogeneous assortment of rules pertaining to the subject and hence pays it little attention in the scramble to make more money. A little mucilage of acacia may be added now and then, or some other simple remedy brought into use occasionally, but the "shake well" label is always handy.

Therefore, it is the author's belief that changing conditions in the field of pharmacy have relegated prescription incompatibilities to a minor rôle in pharmacy of to-day and these conditions necessitate a revision in the methods of teaching this subject.

---

## SUPERSTITION, CREDULITY AND SKEPTICISM

THREE BUGBEARS WITH WHICH PHARMACY HAS ALWAYS HAD TO CONTENT

BY CHARLES WHITEBREAD \*

A belief in the interposition of supernatural powers in the direction of earthly events has prevailed in every age and country in the exact proportion to its want of knowledge. "In the opinion of the ignorant multitude," says Lord Bacon, "witches and imposters have always held a competition with physicians." Galen also complains of this circumstance, and observes that his patients were more obedient to the oracle in the Temple of Æsculapius, or to their own dreams, than they were to his prescriptions.

---

\* Assistant Curator, Division of Medicine U S National Museum



There is an unaccountable propensity in the human mind, unless subjected to a very long course of discipline, to indulge in the belief of what is improbable and supernatural. This is perhaps more conspicuous with respect to medicine than to any other affair of human life, both because the nature of diseases and the art of curing them are more obscure, and because disease necessarily awakens fear, and fear and ignorance are the parents of superstition. Every disease, therefore, the origin and cause of which did not immediately strike the senses, has in all ages been attributed by the ignorant to the wrath of Heaven, to the resentment of some invisible demon or to some malignant aspect of the stars, and hence the introduction of all sorts of superstitious remedies, most of which were intended as expiations to these offended spirits, rather than as natural agents possessing medicinal powers.

Every substance whose origin is involved in mystery has at different times been eagerly applied to the purposes of medicine. A tendency to attribute every ordinary and natural effect to some extraordinary and unnatural cause is one of the striking peculiarities of medical superstition. It seeks also explanations from the most preposterous agents when obvious and natural ones are in readiness to solve the problem. Soranus, for example, who was contemporary with Galen, and who wrote the life of Hippocrates, tells us that honey proved an easy remedy for the thrush of children, but instead of at once attributing the fact to the medical qualities of the honey, he very gravely explains the virtue of the remedy by stating that it was obtained from beehives near the tomb of Hippocrates.

The introduction of precious stones into the materia medica of the past was not based upon any philosophical principle, but arose from a superstition that their beauty and value made them well-adapted receptacles for good spirits. Even those salutary virtues which many herbs possess, were, in the times of great superstitious delusion, attributed rather to the planet under whose ascendancy they were collected, or prepared, than to any natural and intrinsic properties in the plants themselves. Indeed such was the supposed importance of planetary influence, that it was usual to prefix to recipes a symbol of the planet under whose reign the ingredients were to be collected. The character which is used at the head of prescriptions, and which is understood and supposed to mean recipe, is a relic of the astrological symbol of Jupiter, as may be seen in many of the older works on pharmacy, although at present so disguised by the addition of the down stroke which converts it into the letter R, that were it not for its cloven foot we might be led to question the fact of its superstitious origin.

Credulity is closely allied to superstition, yet it differs very widely from it. Credulity is an unfounded belief in what is possible, although destitute of proof and perhaps of probability, but superstition is a belief in what is wholly contrary to the laws of the physical and moral world, thus, if we believe that an inert plant possesses any remedial power, we are credulous, but if we were to imagine that, by carrying it about with us we should become invulnerable, we should in that case be superstitious. Credulity is a far greater source of error than superstition, for the latter must be always more limited in its influence, and can exist only, to any considerable extent, in the most ignorant classes, whereas credulity diffuses itself through the minds of all classes.

Thus mental imbecility is not characteristic of any age or country, in spite of the fact that the United States is accused of possessing more than its share of cre-

dulity, and until comparatively recent times it was not uncommon to hear it called the "Paradise of Quacks." If we refer to the words of Aetius, written nearly 1400 years ago, we discover the existence of a similar infirmity with regard to medicine. This author collected a multitude of nostrums, particularly those that had been celebrated, many of which he mentions with no other view than to expose their folly, and to inform us at what an extravagant price they were purchased. We accordingly learn from him that the collyrium of Danaus was sold at Constantinople for 120 numismata, and the cholical antidote of Nicostratus for two talents. In short, we find an unbounded credulity with respect to the powers of inert medicines, leading down from most ancient times to the elixir and alkahest of Paracelsus and Van Helmont, to the tar water of Bishop Berkeley, to the metallic tractors of Perkins, and the nostrums of our own times. The writings of Scribonius Largus, a Roman compiler of medicines who lived in the first century after Christ, disclose ample evidence that the practice of keeping medicines secret for fraudulent purposes prevailed in a most marked degree in that distant time, while the sacred orations of Aristides satisfy us that the conduct of the Asclepiads was the very prototype of the cruel and remorseless frauds so wickedly practiced by the unprincipled quacks of the present time.

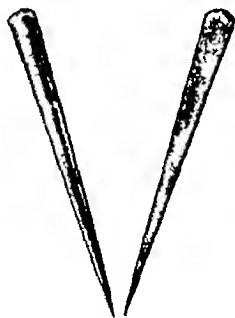


Fig 1 —Perkins' Tractors

A metallic contrivance devised by Elisha Perkins, Norwich, Connecticut 1740-1799, for the cure of disease. Consists of two short conical pointed instruments, each flattened on one side, one having the appearance of brass, the other of steel. They were applied by drawing the points over the affected parts for about 20 minutes at each sitting.—*Courtesy of U. S. National Museum*

Credulity is belief without reason. Skepticism is its opposite, reason without belief, and is the natural and invariable consequence of credulity. For it may be generally observed that people who believe without reason are succeeded by others whom no reason can convince. Suppose, for instance, that a credulous person experiments with a nostrum, or one of our modern "royal roads to health," upon which unworthy and extravagant praise has been bestowed. When such a person discovers that the alleged medicine, or form of treatment, falls entirely short of the efficacy ascribed to it, the chances are that he will not only abandon the use of that particular medicine, or method of cure, but in the future will be unwilling to concede to the healing art in general that degree of merit to which in truth and justice it is entitled, and thus be converted into a skeptic.

There is a saying that there is some good in everything, and many of the practices which superstition has at different times suggested, and credulity has made possible, have not been entirely absurd. In fact, some of them have even possessed, by accident, natural powers of considerable efficacy, while others, although ridiculous in themselves, have actually led to results and discoveries of great practical importance. One of the most remarkable instances of this kind is that of the

sympathetic powder of Sir Kenelm Digby, Knight of Montpelier Whenever any wound had been inflicted, this powder was applied to the weapon that had inflicted it, which was, moreover, covered with ointment, and dressed two or three times a day The wound itself in the meantime was directed to be brought together, and carefully bound up with clean linen rags, but, above all, to be let alone for seven days, at the end of which period the bandages were removed, when the wound was generally found perfectly united The triumph of the cure was ascribed to the mysterious agency of the sympathetic powder which had been so carefully applied to the weapon, when as a matter of fact scarcely necessary to state, the promptness of the cure depended upon the total exclusion of impurities, and upon the curative operations of nature not having received any disturbance The result, beyond

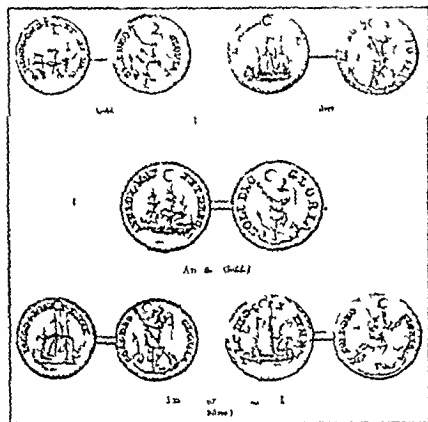


Fig 2—Touch pieces

Types of touch pieces presented to patients after the ceremony of royal touch for the cure of scrofula or King's Evil The touch-piece was worn as an amulet suspended from the neck Royal touch is said to have originated with Edward The Confessor, 1004-1066, and to have been practiced by succeeding kings and queens of England down to Queen Anne (1664-1714)—*Courtesy of U S National Museum*



Fig 3—Transference of Disease

A specimen illustrating one of the many forms of disease transference Section of a tree grown on government grounds near the Naval Hospital, Norfolk, Va The tree had been tapped, human hair inserted in the hole and the hole then plugged and sealed with clay—*Courtesy of U S National Museum*

'If you can get a few strands of your enemy's hair bore a hole in a tree, put them in and plug up the hole you can thus give him a headache which cannot be relieved until the hair is taken out of the tree'—*Encyclopedia of Superstitions*

doubt, furnished one of the first hints which led surgeons to the improved practice of healing wounds by the method which later on was called the first intention

Smallpox inoculation was practiced in India and Turkey on a superstitious principle long before it was introduced as a rational practice It appears that the greatest obstacle which vaccination encountered in India was a belief that the natural smallpox was a dispensation of a goddess, or rather, that the disease was an incarnation of the evil goddess herself, into the afflicted person The fear of offending this goddess, and of exposing themselves to her resentment, necessarily rendered the natives of the East averse to vaccination, until a superstitious impression, equally powerful, with respect to the new practice, was happily effected The new belief was that the goddess had voluntarily chosen the new and milder method of mani-

festing herself to her votaries, and that she might be worshipped with equal respect under the new method

The cures effected by royal touch, which are usually cited as proof of the power of faith over disease, or of mind over the body, seem to have been produced by very different causes. It seems that it was a part of the duty of the royal physicians and surgeons to select such patients afflicted with scrofula as evinced a tendency toward recovery and as the touch of the king, like the sympathetic powder of Digby, secured the patient from the mischievous importunities of art, so were the efforts of nature left free and unhampered and the cure of the disease was not retarded by the operation of adverse remedies

Superstition is diminishing with enlightenment, but we still have with us, and in larger numbers than the average person might suspect, those who wear a bent horseshoe nail around the finger, carry a horse-chestnut on the person, and depend upon madstones and numerous like objects to cure or prevent disease. And it is apparent to all that if it were not for the credulous, the manufacturers of secret nostrums, who viciously prey upon the sick by the use of fraudulent and exaggerated claims, could not continue to thrive until exposed and forced out of business by the state and federal authorities

It must be admitted that at that period in history when reason first began to throw off the yoke of unlicensed authority, it required superiority of understanding, as well as intrepidity of conduct, to resist the powers of the superstitions which had so long held the world in captivity. There was a need of skeptics then, and there is some need for them yet, but it may be well for those who cherish and cultivate a spirit of skepticism, merely from the idea that it denotes the exercise of a superior intellect, to remember, as some one has said, that "unlimited skepticism is as much the child of imbecility as implicit credulity."

Those engaged in any branch of health work learn quickly enough that the old foes of medical progress—superstition, credulity and skepticism—are still rampant. The superstitious continue to try out their magic cures or preventives. The credulous resort to the use of the vicious secret nostrums, while the skeptics just delay action for no good reason except a general disbelief in most everything. After adding other causes of people's dilly-dallying with such an important matter as health, such as carelessness, disregard of personal or community health, false economy, etc., it seems wonderful that medical science is accomplishing so much with so many hindrances.

We have learned that many diseases, including those which are exacting the heaviest toll, are curable if early warning signs are heeded promptly. The health authorities and association workers are doing much to acquaint the people with danger signals which precede serious conditions of health. The "have a physical examination on your birthday," and "see your dentist twice a year" slogans are sending home the thought that it is good policy to ascertain periodically how the body is functioning, while the "your druggist is more than a merchant" slogan and others like it direct the people to the source upon which they should rely completely in matters pertaining to the dispensing of medicines. The past few decades have been filled with medical discoveries of the highest importance. With these discoveries have come successful methods of combating heretofore uncontrollable diseases. More research along medical and health lines is being carried on than ever

before The colleges are preparing graduates more fully equipped to practice medicine, dentistry, pharmacy and all branches of health work, and hospital service and nursing have reached points approaching the ideal

The accomplishment of reducing the death rate of tuberculosis in the United States in a comparatively short time from 201 to 81 per 100,000, and the success which has followed the application of scientific methods to the prevention of typhoid fever, diphtheria and many other diseases, are examples of what is being achieved by cooperation

An enormous amount of work is being done to teach the public that the help of each individual is needed if the best result is to be obtained Well thought out campaigns are being carried on against disease, and much money is being spent to impart the simple knowledge that delays are dangerous when health is involved In view of all that is being done, it is somewhat discouraging at this late day to know that there are educated people in this country who possess madstones, and like magic charms, and have faith in them as curative and preventive agents, to see friends who should know better than to patronize the venders of worthless secret nostrums, and to hear the skeptics condemning generally accepted methods of treatment

The bugaboos of progress—superstition, credulity and skepticism—are not new enemies of physicians and pharmacists, and the task of health workers in the future, as in the past and present, must be not only to conquer and control diseases, but to train those who retard progress to think right and act promptly when their health or that of others is concerned

#### HUGH MERCER BOOK OF 1769

The Hugh Mercer Apothecary Shop of Fredericksburg, Va has received an old volume which bears the book plate of Dr or Gen Hugh Mercer with his coat of arms and under it written, in Dr Mercer's handwriting,

Hugh Mercer 2-6 February 1769 " On the title page appears again Hugh Mercer " The book was given by E Y Guernsey of Bedford, Ind, at the request of William E Carson, of Riverton, Va, chairman of the Virginia commission on conservation and development

Mr Guernsey a director of the Indiana Federation of Art Clubs, has found that the book passed into the hands of Gen Thomas Posey, who carried it to Indiana, and from General Posey it passed to Governor Jennings Indiana, who was born in Rockbridge County, Va Governor Jennings' Indiana home was in Charlestown, where Mr Guernsey procured the book

General Thomas Posey, of the Fredericksburg region was a member of the No 4 Masonic Lodge here at the same time that General Washington, Weedon, Woodford, Wallace and Mercer were members He was a member of the Virginia Committee of Correspondence, a brigadier general in the Revolutionary War United States Senator, Governor of Indiana

1816-1818, and Indiana Agent at Shawneetown, Ill where he died in 1818

The book bears marginal notes in the handwriting of General Mercer The title page of the book reads Chronological Tables of the World—Commencing with the Creation and Ending with the Nativity of Jesus Christ—Comprehending Ye Space of 3950 years Digested into Ye Same Method with Ye Chronological Tables of Col W Parsons By the Reverend Mr Adam Blandy, M A, and late Fellow of Pembroke Coll Oxon "

#### ALEXANDRIA CITIZENS SEEK TO PURCHASE THE BUILDING FORMERLY OCCUPIED BY LEADBEATER PHARMACY

George A Ball, of Muncie, Ind, has donated \$1000 to the Association for the Preservation of Alexandria Antiquities, other amounts have been donated and a final effort will soon be made to raise the necessary amount for retaining the equipment purchased for the AMERICAN PHARMACEUTICAL ASSOCIATION as a Museum The ASSOCIATION agreed to leave this material in Alexandria, provided the Alexandria organization acquires the building by purchase and maintains the Old Apothecary Shop as a museum

## PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and Branches shall become the property of the Association with the understanding that they are not to be published in any other publication prior to their publication in those of the Association, except with the consent of the Council"—Part of Chapter VI Article VI of the By-Laws

ARTICLE III of Chapter VII reads 'The objects and aims of local branches of this Association shall be the same as set forth in ARTICLE I of the Constitution of this body *and the acts of local branches shall in no way commit or bind this Association and can only serve as recommendations to it* And no local branch shall enact any article of Constitution or By Law to conflict with the Constitution or By-Laws of this Association "

ARTICLE IV of Chapter VII reads 'Each local branch having not less than 50 dues paid members of the Association holding not less than six meetings annually with an attendance of not less than 9 members at each meeting and the proceedings of which shall have been submitted to the JOURNAL for publication may elect one representative to the House of Delegates "

Reports of the meeting of the Local Branches shall be mailed to the Editor on the day following the meeting if possible Minutes should be typewritten with wide spaces between the lines Care should be taken to give proper names correctly and manuscript should be signed by the reporter

### CAIFORNIA COLLEGE OF PHARMACY MACY STUDENT BRANCH

OCTOBER 4, 1933

President ISI called the meeting to order Mr Mac Williams suggested that we give Mr Doble and the program committee a vote of thanks for the fine program they arranged which preceded the meeting it was moved, seconded and passed upon Mr Doble then asked the members to cooperate with the honor society which was approved of by all the members

Mr Yerman discussed the possibilities of having a drug garden and stated that he had corresponded with various drug concerns from which he obtained very satisfactory information on drugs President ISI suggested that Mr Yerman obtain the assistance of some other member on the project

A discussion on the payment of dues was brought up, upon which was decided that Treasurer Uomini have the new members pay their dues in the best way possible Following a general discussion on the dates concerning the holding of meetings, President ISI announced to the prospective members that the day meetings would be held on every third Thursday of the month in the Cafeteria and the evenings would be held on the first Wednesday of the month

Mr Doble announced that various programs would be arranged during the day and that the entire student body would be invited

Mr Mac Williams gave a brief talk concerning the president of the AMERICAN PHARMACEUTICAL ASSOCIATION

W Bruce Philip also outlining the aims of the A PH A to the prospective members and earnestly requested that they join Mr Mac Williams then announced that a surgical supply demonstration would be held here soon

*Program Preceding the Meeting of October 4 1933*—Mr Mac Williams, our sponsor and adviser gave a brief talk on the aims of the A PH A and invited the students of the college to join, after which he introduced the president John ISI After thanking Mr Mac Williams, President ISI introduced the Dean of the college Dr Carey Dr Carey said a few words on the benefit such an organization as this would have on raising the standards of Pharmacy Dr Max Marshall, of the Hooper Foundation was then introduced by Dean Carey Dr Marshall gave a very interesting illustrated talk on the high points of bacteriology and its relation to Pharmacy Several of the subjects he covered were

Historical High Lights of Bacteriology '  
"Pasteur and Bacteriology"

Modern Bacteriology and Its Various Fields "

Upon the conclusion of Dr Marshall's talk Mr Mac Williams thanked him and asked that the members of the A PH A remain for a meeting and invited all students interested in the A PH A to remain

NOVEMBER 1 1933

The meeting was called to order by President ISI The minutes of the previous meeting were read and approved

Mr Yerman announced very favorable progress on the drug garden and there followed a general discussion on the subject

Mr Popoff announced he had in his possession a few old Italian prescriptions which were very comical and interesting, which he read

Due to the absence of Vice President Allen Caldeira from school this year it was suggested that a vice president be nominated. Nominations were opened by the president, who nominated Mr Doble and he was elected

Mr Doble then announced that the only future field trip planned was a trip to the Alvarado Beet Sugar Plant and the possible date would be November 18th. Mr Doble also announced that he had inquired at the Presidio as to the rank of a Pharmacist in the army and found that the Pharmacist ranked under the Medical Administrative Corps and that the ratings were second lieutenant and captaincy. He also gave all the requirements and the wages paid

Mr Mac Williams gave a general talk on the organizations of the college. He urged the students of the A. Ph. A. to keep up their interest. He also asked that they continually attend the meetings and urge the members who are continually absent from meetings to attend also. Mr Mac Williams then suggested that the secretary contact the alumni of the Bay area and inform them of the A. Ph. A. so as to obtain their interest

Mr Mac Williams stated that California is to have a new Pharmacy Law in 1935 and asked the members to assist the faculty to draw up an ideal Pharmacy Law. He also stated there would be a distinction between the word 'Pharmacist' and the word 'Druggist' in this law. He then suggested that the members contact the University of Southern California College of Pharmacy so as to have their help in obtaining enough power to procure recognition on the new State Pharmacy Law of 1935

Mr Mac Williams informed that the A. Ph. A. was strictly specialized and asked that the members become friendly with the State Associations as it might be helpful in gaining recognition in 1935. He concluded by asking that representatives attend the State Pharmaceutical Conventions for the purpose of recognition

EUGENE BETTENCOURT *Secretary*

#### CHICAGO

The first monthly meeting of the school year 1933-1934 was held at the University of Illinois

College of Pharmacy 715 S Wood Street, Tuesday evening, October 17th

The meeting was called to order by President R. E. Terry

Dean Day gave a résumé of the Plant Science Seminar held at Madison, Wisconsin, he was the chairman of this group of college teachers interested in Pharmacognosy. The meeting occupied an entire week and consisted of talks, business meetings, field trips and also side lines of interest

A very interesting report was given of the pleasant surroundings enjoyed by the group of a visit to the Forest Products Institute where lumber and woods are tested, treated, etc. Lantern slides of American Medicinal Plants were shown to the group. These were taken by a former University of Wisconsin photographer and Dean Day suggested that he would be able to obtain these and present them to our group at some future meeting

Professor Gathercoal presented a report of the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION held at Madison. A chart was placed on the board showing twelve distinct sub-divisions of the ASSOCIATION, the number of meetings each held and some of the work that had been done by each group. Professor Gathercoal mentioned that the undertone at the convention was the distinguishing between professional pharmacies and the commercial drug stores

Professor Terry gave a short report of the N. A. R. D. convention held in Chicago. He also gave a discussion of the professional pharmacy exhibit that was shown at the A. Ph. A. convention and the A. M. A. convention. This exhibit of charts and preparations was compiled by J. Leon Lascoff, pharmacist, of New York City

A rising expression of thanks was extended to the speakers of the evening

LAWRENCE TEMPLETON *Secretary*

#### DETROIT

The October meeting of the Detroit Branch AMERICAN PHARMACEUTICAL ASSOCIATION was held at Webster Hall, Thursday evening, October 19th. The meeting was preceded by a dinner

At the dinner Wilbur L. Scoville was introduced by President Edwin Johnson of the University of Michigan who welcomed Dr. Howard B. Lewis, recently appointed Dean of the College of Pharmacy of the University

of Michigan Mr Scoville recommended Dr Lewis for honorary membership in the Detroit Branch A Ph A The election was unanimous

Dr Lewis thanked the Detroit Branch for the honor and assured the members that as Dean of the College of Pharmacy he would continue to lend every effort and support to the Detroit Branch

The meeting was called to order by President Johnson The minutes of the previous meeting were presented by the secretary

The first speaker on the program introduced by the president was Clare F Allan past-president of the National Association of Boards of Pharmacy who reported on the convention of that Association held at Madison Wis

Mr Allan said thirty six states were represented at that meeting an all time new record for that organization Part time of the secretary of the National Boards of Pharmacy had been given to the Century of Progress Exhibit by the Association Recently Georgia and Wyoming joined the many states requiring the prerequisite

The next speaker was Professor Charles H Stocking of the University of Michigan past-president of the American Association Colleges of Pharmacy Professor Stocking reported on the convention held by this Association While 1694 students 52 with advanced degrees were graduated from recognized colleges of pharmacy in 1933, the attendance of pharmacy students has decreased 23% Professor Stocking, like Mr Allan, made it clear that their organizations were striving hard for the advancement of pharmacy They lamented the fact that the Michigan Legislature did not see fit to raise the standards of pharmacy at the last session to meet the requirement of our border states and the national associations They insisted, however they would not stop fighting for the prerequisite law

Secretary L W Rowe of the Scientific Section of the AMERICAN PHARMACEUTICAL ASSOCIATION, reported on the Convention of the A Ph A Notwithstanding the existing conditions the attendance was up to standard and the meeting was one of the most interesting ones he had attended in many years Much constructive work was done and considerable time was devoted to the Code He commented on the reports of President W Bruce Philip and the President-Elect Robert L Swain

An account of the new deal in the National Association of Retail Druggists was given by

John H Webster, former president of that Association, who also commended the Exhibitors' Association for the splendid drug show held in conjunction with the N A R D Convention in Chicago

A general discussion followed, lead by Messrs Webster Dikeman and Hayes Mr Hayes presented many good points and thoughts on modern merchandising to the members of the Detroit Branch

At this meeting a representative from each of the four recognized colleges of pharmacy was present E H Wisner of Ferris Institute Dean R T Lahey, of the College of Pharmacy of the College of the City of Detroit J L Dorion of Detroit Institute of Technology and Dr Howard B Lewis of the University of Michigan A good representation of teachers and students from the local colleges of pharmacy were present President J Walter Runciman, of the Detroit Retail Druggists' Association was also in attendance

A rising vote of thanks was given the speakers BERNARD A BIALK *Secretary*

## NEW YORK \*

The Remington Honor Medal was presented to Dr Evander F Kelly secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION, at the regular meeting of the New York Branch held on October 11th

Prior to the meeting a get together supper was served at the Pythian Temple in New York City About one hundred members and guests attended this part of the evening's activities

The presentation of the medal took place at the Branch meeting in the New York College of Pharmacy, Columbia University President Ernst A Bilhuber was in the chair and called the meeting to order On a motion made by Dr Kidder and duly seconded the business part of the meeting was omitted and President Bilhuber immediately proceeded with the special program

Dr Bilhuber, in his introductory remarks outlined briefly the history of the Remington Medal and mentioned the names of previous recipients of the honor

Following this the guest speakers were individually introduced by the president

Dr Robert L Swain who spoke on Kelly the Educator' Dr Henry A B Dunning, who spoke on 'Kelly the Association Man,'

\* See also October JOURNAL, page 1006



Dr Samuel L Hilton, who spoke on "Kelly, the Co-Worker," Editor Eugene G Eberle who spoke on "Kelly, the Associate and Friend"

Immediately before the actual presentation of the medal, Dr Billhuber called attention to the fact that Mrs Kelly, without doubt knew the recipient better than any of the previous speakers and although we had not heard from her she was undeniably in a position to tell a great deal about his life In recognition of Mrs Kelly's part in the medalist's life, she was presented with a bouquet of flowers by the president of the Branch Mrs Kelly was applauded by the members and guests

Dr Otto Raubenheimer, past president of the New York Branch, in a very brief and sincere message congratulated Dr Kelly on his numerous achievements whereupon the medal was presented to our honored guest

Dr Kelly delivered his address, which follows

It has been my privilege to have been connected with pharmacy for nearly thirty five years and, during that time to have served in almost every division of it It has been my privilege, also, to have known a large number of the men and women associated with pharmacy including many of the leaders in both the profession and the industry It was my good fortune to know the distinguished pharmacist in whose honor this award is named

' With very few exceptions mine has been a pleasant experience and a profitable one not so much in material gain as in the splendid contacts and rich friendships that have been made possible for me and which are life's greatest rewards My entry into pharmacy was entirely accidental on my part and was intended to be but brief The work and the prospects were soon found to be so interesting as to lead to the adoption of pharmacy as a life's work a decision which so far there has been no cause to regret My apprenticeship was spent in a well conducted pharmacy under a good preceptor, and pleasant surroundings and among delightful people one in particular It later became possible for me to enter upon a course in pharmacy in the Maryland College of Pharmacy now the School of Pharmacy of the University of Maryland and in this institution then an organization of pharmacists with a teaching faculty, to come under the instruction and influence of a truly remarkable group of pharmacists Among them were such leaders as Caspari Simon Culheth, Hynson, Base,

Schmidt, Piquett, the Dohmes, Hancock, Elliott, Mansfield, Frames and many others who impressed me by their ability, their love of the profession and their code of ethics This circle of friends and advisers has steadily widened in the intervening years I am happy to say Their guidance and support have made it possible for me to do the work in which I have been interested, and they have contributed to such progress as has been possible for me The lack of time and my inability of expression make it impossible to name all of them and to pay the tribute to these friends that they deserve I am glad to thus briefly acknowledge my great indebtedness to them

You will, I am confident understand a special reference to one of this group Charles Caspari, Jr, influenced my life by precept and by example more than any person outside of my family and it is a privilege to pay this tribute to his memory

"As our British cousins express it, Mrs Kelly associates herself with these statements and joins me in sincere thanks to those who, in cooperation with our friend, Dr Schafer, established this medal, to those who awarded it to me to those who arranged for this ceremony to those who have spoken so kindly tonight and to those other good friends who by their presence here or by their messages or otherwise have made this such a memorable occasion for us and for our children

"The receipt of such an honor is a high mark in any pharmacist's career and it has led me, with other events to a rather searching appraisal of myself and of the calling to which my working life has been given The self appraisal is of no interest here other than to mention that it has occurred with greater frequency as the years have passed and with increasing concern to the appraisee Certain comments about our profession may be of interest as your working life or that of those dear to you have also been devoted to pharmacy

"The working life of the individual is, at the best, but a comparatively short period of time To those who live with purpose and effect, it seems entirely too short to those who merely live, time is of but little importance During this brief period, we make our entire contribution to human progress There can be no repetition no opportunity to correct omissions or mistakes From the standpoint of the general welfare, the working life is the most precious possession that the individual can give

to any cause and, by the same token, it is the most valuable contribution that any cause can receive from the individual. The sum of the working lives of the individuals is the total of human progress.

"The choice of the activity of which our working life is to be given is probably the most important decision of our lives. A few changes from the first choice, frequently the first choice leads into other fields of endeavor, but the large majority follow the original selection. Despite its importance, the selection is usually accidental or is influenced by circumstances and surroundings. Possibly this procedure is Nature's way of maintaining the balance but the result might at times lead to the conclusion that progress is made in spite of rather than because of our own efforts. The selection of those who enter our profession is a question of primary importance to its future.

The success and future progress of a profession depend in large measure, it seems to me, upon four conditions: its necessity to human welfare and comfort, and its contributions to the general good; the ethics and restrictions under which it is practiced; the attitude to the profession of those who practice it, and, lastly, the surrounding conditions.

'It appears to be well established that pharmacy was an organized activity when recorded history began and that it has had a continuous existence since that time. Its history despite the dark spots that mar the record of all human activities is creditable and indicates that pharmacy has kept reasonably abreast of progress in other fields. In addition to its own development pharmacy has contributed to human knowledge and to the progress even to the establishment of other callings as it has received aid from others. Unless it had been a necessary service it would not have stood the long test of time and would long ago have disappeared as an organized division of society. Pharmacy has earned recognition as a separate and important division of medical care, through its long service and through its contributions to public health and to human welfare.

"Although it has been led astray at times and has lent itself to practices contrary to and outside of its purposes the course in general has been so true as to be a source of pride and inspiration to every pharmacist especially when the responsible character of its work and the dangerous properties of many of the substances it employs are considered. If the past

is a guide to the future, the permanency of pharmacy as a public health profession is assured as far as any assurance can be under stood.

"The code of ethics and the governmental as well as voluntary restrictions which pharmacy has developed and accepted for its own regulation are in accord with its aim and purposes, and reasonably bear comparison with those of other public health professions. The training and educational process for entry, the tests imposed for registration, and the restrictions on the practice of pharmacy are designed to develop a responsible citizen and a dependable pharmacist and to provide adequate service and reasonable protection for the public interest. The approved ethics and standards indicate a rather high purpose for the calling and that its practitioners accept pharmacy as a profession with a clear recognition of the responsibilities and limitations imposed and accepted. It must be evident however, to anyone who makes himself acquainted with present-day conditions that pharmacy has not had legal protection, in its file commensurate with these responsibilities and limitations and in keeping with the public interest. Drugs and medicines because of their nature cannot be dealt with as ordinary articles of commerce, and public welfare demands that they be dealt with on a different basis.

There has been and probably will be for some time considerable variations between professional ideals and professional practice. The variation is easily noticeable in our calling and in too many instances is objectionably evident. It is no doubt taken by the public to reflect the attitude of pharmacists toward their profession.

Two unfortunate conditions contribute to this situation which should be recognized as dangerous to our future. Pharmacy is required to furnish articles as well as professional service and advice and is therefore subject more than other professions to certain influences of a commercial rather than a professional character. In the present tendency to distribute anything and everything, and in the apparent lack of a definite objective, the public sees the widest variations between our professional ideals and our actual practice. Recent developments in governmental procedures have brought pharmacy face to face with the dangers of over commercialization and with the necessity for a decision as to whether it shall be primarily a profession or a business.

The second condition is that, while the registered pharmacist is strictly regulated in his practice, those not registered are permitted to engage indirectly in practice. A similar evasion is possible in other legally controlled professions but not to such an extent as in pharmacy. Many institutions some of which are manifestly distributing agencies in the main, are permitted to operate under the name and reputation of pharmacy without the restrictions imposed on qualified pharmacists. They are frequently owned and operated by those who have had no basic training in pharmacy, who are unacquainted with its service or ethics, who know but little about the dangers involved for the public and who are in the very nature of the case interested principally in the possible profits. Such persons have a useful place in commerce but have no place in a profession dealing so intimately with life and death.

There can be no reasonable criticism of business or of those who engage in it. Business is as necessary to human welfare as the arts or the sciences or the professions. Every profession must have a business background and be conducted on sound economic principles. The pharmacist must buy and sell. But he cannot long expect the status and the advantages of a professional man without giving the professional requirements his major thought and attention. He cannot hope to escape the classification of a merchant if he makes business activity and retail distribution his major concern. The law of cause and effect works in our activities as inevitably as in all others. The attitude of pharmacists to their profession must decide this issue.

The general conditions surrounding the practice of pharmacy in our land are probably as favorable as those of other professions. The pharmacist is accepted as a useful and respected member of society. The drug store or pharmacy is recognized as an important institution in every community and has made a useful place for itself in the lives of the people. The jokes poked at it recently indicate that the public realizes how far many pharmacists have wandered from their real function and not that confidence has as yet been lost in pharmaceutical service or in the integrity of the pharmacy as an institution. The Chief Magistrate of the Nation has recently recognized pharmacists as professional persons—and our national and state governments in connection with matters of great importance, have repeatedly

shown their confidence in the profession by intrusting to it certain very responsible duties. Recent intensive surveys, conducted by those outside of our profession, have shown beyond question that pharmacy continues to be a necessary public health profession and that in personnel and in extent and character of service it occupies a position of importance in our social organization. Its ethics, its self imposed standards its educational requirements and its equipment are being steadily advanced. Contrary to the statements of its critics and of those who see it as a vanishing profession pharmacy has made progress in recent years, has improved its service and has strengthened its position as a profession. A keen student of the situation has recently said that 'one weakness of pharmacy as we see it to day is the failure of the public to recognize the part it plays in the modern treatment of disease'. He might have said that the weakness of pharmacy is its own failure to realize and fully discharge its part in public health. The public cannot be expected to recognize what it cannot see and it must be evident that in recent years pharmacy has studiously hidden its public health service, splendid as it is from public view. Our programs our papers and our publications have emphasized almost everything else except our public health service and connection, which are, evidently the reasons for our existence and the very basis of our strength. The principal effect of Pharmacy Week which we celebrate this week, has been to emphasize professional pharmacy to pharmacists.

In the present century our nation has undergone a voluntary social revolution of the most fundamental character and of the widest scope. Our theories of living, of government of religion of ethics and even of thinking have been radically changed. One of the outstanding changes is in the public attitude to health and physical well being. Public health is to day probably the most powerful social force next to education and possibly to the church. People are health conscious and health anxious. They no longer look on health as an accident of birth or condition but as something to be won and controlled. Those who minister to health are no longer mysterious and to be consulted only in emergency, but are valued as among the most important public servants.

Pharmacy's part in the treatment and prevention of disease and in the presentation and improvement of the public health is

important and creditable The Charter's Report said 'A well-informed pharmacist is the best single individual to disseminate information about public health' The Committee on the Costs of Medical Care reported that 'Drugs medicines and medical supplies are essential to an adequate medical service, both therapeutic and preventive'

"It is nevertheless true that pharmacy has not recognized its opportunity nor fully discharged its responsibility in the public health movement—as these reports also indicate Its sixty thousand pharmacies should be looked upon as so many public health stations by the public In this respect the attitude of the members of our profession and even of its leaders has been unfortunate For its own welfare and future progress pharmacy should emphasize its present contributions to public health and should increase them to the extent of its capacity With its personnel its organization, its equipment and particularly in its intimate contacts with the people pharmacy could be and should be one of the dominant forces in public health Now it is considered by many only as a distributing agency and at that, of many articles of doubtful value to public health

"We should realize too that the public have not only become interested in public health but also critical of those whom they have licensed to protect and control it The existence of a Committee on the Costs of Medical Care, its title and the character of its final report are extremely significant to the public health professions The serious proposal to even partly socialize medical care carries its own message Developments in other countries show that it cannot be lightly dismissed

'I have no fear that pharmacy will disappear because of the profound conviction that it is a necessary and indispensable public health service There can be a question as to how and by whom the service will be rendered in the future Fortunately the answer is to this time at least, in our hands We cannot however, give our major thought and attention to other matters and expect this all important question to answer itself in our favor With a little organized thought and effort the public attitude could be changed and self control in our field assured us

'The history of pharmacy, the professional obligations that pharmacists assume on accepting registration and the soundest economic judgment, leaving ethics entirely aside should

influence them to take their proper and responsible part in public health, to contribute their full share in its advancement and to receive the recognized professional status and the return to which they would be so richly entitled It is difficult to conceive of a greater opportunity or a deeper satisfaction than to contribute to the health and physical well being of people

"Pharmacy has been a kind and considerate professional mistress to me It has given me the opportunity to live a full life in a worth while calling It has honored me and I have thoroughly enjoyed my life If a text had been a part of these remarks, the following would have been my choice

"Wherefore I perceive that there is nothing better, than that a man should rejoice in his own works for that is his portion for who shall bring him to see what shall be after him"

"I like to paraphrase St Paul's statement to read, 'They are members of no mean profession'

"Pharmacy and those who practice it, have had and will have my fullest confidence and support so long as it is permitted me to give them"

Dr Kelly's address marked the close of the exercises and the meeting adjourned

The meeting was well attended, about one hundred and thirty members and guests being present

RUDOLF O HAUCK, *Secretary*

## NORTHERN NEW JERSEY

The first meeting of the Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on September 28th, in the Rutgers University College of Pharmacy Building, at Newark All but three of the charter members were present and it was with a thrill of anticipation that we awaited our first call to order by Dr Little.

Dr Little was made temporary chairman, and Professor Schicks temporary secretary The chairman appointed a nominating committee which reported for the following officers *Honorary President*, Dr Philemon E Hommell, *President*, Dr Ernest Little, *Vice President*, Professor Geo C Schicks, *Secretary*, Dr L W Rising, *Treasurer*, Prof A F Marquar

The report was unanimously accepted

The constitution and by-laws of the branch were read and officially adopted

Dr Little outlined plans for the operation of the branch, after which the meeting was adjourned

#### SECOND MEETING

The Northern New Jersey Branch, A P H A, convened October 16th at the Rutgers University College of Pharmacy, Newark, for its second meeting

In the interim between the first and second meetings, Dr Little had appointed the following as members of the standing committees

1 *Membership*—Robert W Rodman, *Chairman*, Grace I Harper, Emme J Doyle

2 *Professional Relations*—S B Mecca, *Chairman*, John N Silsby, George C Schicks

3 *Science and Practice of Pharmacy*—C L Cox *Chairman*, Louis W Rising, O P M Canis

4 *Education and Legislation*—Lloyd K Riggs, *Chairman*, H E Wensch, Philemon E Hommell

5 *Program*—Robert W Rodman, *Chairman*, Lloyd K Riggs, George C Schicks B J Chiego, J M Block, Marie C Jannitti

The committee chairmen reported on the duties and objectives of their respective bodies

Dr L K Riggs and Prof W L Sampson were received as the first new members of the Branch

Robert W Rodman gave a brief but entertaining résumé of the history of the AMERICAN PHARMACEUTICAL ASSOCIATION The meeting was then given over to an open forum for the discussion of the proposed Food and Drugs Act If subsequent forums are as worth while as this, our first, they are going to prove helpful indeed

L W RISING, *Secretary*

#### PHILADELPHIA

The October meeting of the Philadelphia Branch of the A P H A was held in the museum of the Philadelphia College of Pharmacy and Science on Tuesday evening, October 10, 1933

Professor LaWall introduced the speaker of the evening, C S Brinton, Chief of the Philadelphia Station of Food and Drug Administration, U S Department of Agriculture who presented a discussion of the new Food and Drugs Act A large series of displays assisted the lecturer in demonstrating adulterations and false advertising possible under the present Food and Drugs Act

Mr Brinton summarized his discussion as follows

"The aim of the present food and drugs act is to protect public health and to prevent deception of consumers Twenty-seven years of enforcement have revealed many weaknesses in the law The new bill is intended to plug these loopholes and to make the statute a more effective instrument against modern abuses It preserves all worthy features of the present law and contains in addition the following new features

"1 *Jurisdiction over False Advertising*—Many foods and drugs bear no false statements on their packages but their advertising is blatantly deceptive Legal actions under the present law against false labels result merely in correcting the label while continued deception of consumers may be accomplished by advertising the false claims formerly made on the labels

"2 *Inclusion of Cosmetics*—The health of many persons is impaired by poisonous cosmetics and false labels and advertising are frequently employed for these products The present law has no jurisdiction over cosmetics This bill will correct these evils

"3 *Better Control of Poisonous Foods*—The present law contains no provision against poisons in foods unless they are added This bill prohibits the sale of dangerous foods regardless of whether the hazard is caused by added poisons or otherwise Under the present law the testimony of expert toxicologists must be introduced in every case to show the quantity of added poison in the food may be harmful to health The bill authorizes the secretary to acquire expert advice and then to fix a safe tolerance for added poisons

"4 *Authorization to Establish Definitions and Standards for Food*—The present law authorizes the establishment, in the limited field of canned foods only, of one standard of quality for each generic group of canned food This bill authorizes the establishment of standards of identity and definitions of quality for all foods

5 *Permits May Be Required for the Manufacture of Food* that may be injurious and against which the public cannot be effectively protected by other provisions of the bill Some foods are susceptible of dangerous contamination in unsanitary factories The detection of such contamination by examination of samples from interstate shipments, the only procedure authorized by the present law, is often difficult or impossible Under this bill permits may be required for the interstate shipment of such foods, and permits would not be given unless warranted by sanitary conditions in the factories

6 *Provisions Made for More Adequate Control of False Curative Claims for Drugs*—Many persons are influenced by false curative claims for drugs to postpone or discontinue rational treatment for serious diseases. Frequently the disease is thus permitted to progress and illness is protracted or untimely death follows. As stated in (1), there is under the present law no control of false curative claims in advertising. Even in establishing a case against such claims in labeling which, unlike advertising, is subject to the present law, the Government must show not only that the claims are false but that the manufacturer *knows they are false*. Public protection against this evil is therefore inadequate because proof of a manufacturer's actual state of mind is extremely difficult to establish. The new bill prohibits false curative claims in both labels and advertising. The Government would not be required to show that the manufacturer knows they are false.

7 *Fully Informative Labeling of Foods and Drugs Required*—The present law prohibits false labeling but does not require the manufacturer to state the whole truth as to what his product is. This bill requires foods to be labeled with their common names and drugs to be labeled with the common names of each therapeutic or physiologically active ingredient. It is an expression of the right of the consumer to know what he is eating and what he is taking for his ills.

8 *More Adequate Penalties*—Penalties in the present law are very mild. They may be regarded by some unscrupulous firms as license fees for the conduct of a lucrative illegitimate business. Heavier penalties in the bill and authorization to stop violations by injunction proceedings should have a deterrent effect on those manufacturers who are disposed to risk violations for monetary gain.

At the close of the meeting each of the 150 members of the audience was urged by Mr. Brinton to write his Senator for a copy of the New Food and Drug Bill, Senate Bill No. 1944.

EDMUND H. MACLAUGHLIN, *Secretary*

## MEETINGS OF PHARMACISTS AND PHYSICIANS

On October 24th pharmacists of New York City arranged for a dinner at Pennsylvania Hotel participated in by physicians and pharmacists about 300 were present. Dr. Curt P. Wimmer presided as toastmaster, among the speakers were Dr. Harlow Brooks,

Dr. J. C. Gerster, Dr. Terry Townsend, Dr. Walter Bastedo, Chairman E. F. Cook, Dr. William C. Anderson.

In the talks it was emphasized the medical students should be taught to prescribe from the Official Standards. A feature of the occasion was a display of U. S. P., N. F. and Recipe Book preparations.

A meeting of physicians and pharmacists was held November 3rd. It has become an annual custom to hold a combined meeting of physicians and pharmacists in the P. A. R. D. building in the fall and, later, the Philadelphia County Medical Society sponsors a like meeting in their home at 21st and Spruce Streets.

## PUBLICATIONS RECEIVED

A booklet of sixty pages on 'The History of Apothecaries Practice in Nurnberg' has been published as a memorial to the medical college on its celebration of the two hundredth anniversary in which the members of the Nurnberg College of Pharmacy have participated. There are many historical notes which deal with the apothecaries of various periods during the bi-centenary.

Contributions to the 'Knowledge of the Sources of Catechins and Tannin Containing Drugs' with special reference to catechin of cola fruit, an inaugural dissertation for the Ph.D. degree by Karl Reber, Berne, Switzerland. The author feels obligated to Dr. H. Zornig and Dr. P. Casparis. Reprint of the research covers more than fifty pages.

Copy of a descriptive booklet published in commemoration of the opening of the Merck Research Laboratory at Rahway, New Jersey, on April 25th last. The booklet contains the complete address given by Sir Henry Dale on that occasion as well as a description of the Laboratory. Also a copy of 'A Chemical Almanac' prepared for distribution at the Merck Exhibit in the Hall of Science at 'A Century of Progress'.

A forty-page booklet dealing with the Museum of Science and Industry, Chicago, founded by Julius Rosenwald—An institution to reveal the technical ascent of man by Waldemar Kaempffert. It follows somewhat that of the museum at Munich in which the idea of Dr. von Miller is carried out.

# COMMITTEE REPORTS

## REPORT OF LEGISLATIVE COMMITTEE, A PH A

Our esteemed and capable president, W Bruce Phillip, presented a paper, at our last annual convention before the Section on Education and Legislation, entitled 'How the Drug Stores May Influence Five Million Votes This November,' of course, meaning the November just past. As each of you know, the difference of the popular vote at that election was near ten million. Can we suppose that Mr Phillip's five million was an integral part of that ten million plurality? Let us so consider it and credit him with the result obtained.

On October 12, 1932 the American Bar Association approved the revised draft of the proposed uniform state Narcotic Act adopted by the Conference of Commissioners on Uniform State Laws. The fifth tentative draft was revised by the Narcotic Bureau in collaboration with representatives of the Drug Trade as far as it was possible. Our Association was ably represented by Drs Swain, Kelly, Hilton and Eberle together with President W Bruce Phillip, who did not approve the final draft being displeased with several of the draft's features. nevertheless, the final draft was adopted over your representatives' protest. This final draft is being submitted to the various state legislatures. This bill especially restricts the sale of exempt narcotics to registered pharmacists.

The final agreements adopted by the International Narcotic Conference at Geneva were adopted by the United States July 9 1933. The effect of this action limits the importation and manufacture of opium and its derivatives. The immediate result, as you have noticed, is the sharp advance in the price of codeine and its salts.

Another item of interest in the narcotic field was the attempt of Administration forces to combine the Narcotic and Prohibition Bureaus of the Federal Government, but when attention was called to the fact that the United States was a member of the International Narcotic Congress and that United States narcotic relations with foreign powers were controlled by treaties, the idea, so far as the Narcotic Bureau was concerned, was abandoned and the Bureau of Industrial Alcohol substituted for the combination with the Prohibition Bureau.

In February of this year the Food and Drug Administration of the Department of Agriculture issued Bulletin CR 17-H wherein they deplore the extent of labeling by manufacturers by making various therapeutic claims for drugs and naming of organs of the body. The Department stated 'Persons who make or deal in substances or composition, may be held to good faith in their statements.'

Following this declaration of the Department and well into the special session of the New Congress convened March 4th there was presented to this Congress a new and more stringent Pure Food and Drug bill. Due to the urgent requests and requirements of our new President the Congress did not consider the proposed bill, but it is very evident that the said bill will be presented early in the regular session coming in January 1934. Briefly, some of the features of this new bill as expounded by Hon W G Campbell, Chief of the Federal Food and Drug Administration are as follows:

Cosmetics are brought within the scope of the statute.

Mechanical devices intended for curative purposes and devices and preparations intended to bring about changes in the structure of the body are also included within the purview of the law.

False advertising of goods, drugs and cosmetics is prohibited.

Definitely informative labeling is required.

A drug which is or may be dangerous to health under the conditions of use prescribed in its labeling is classed as adulterated.

The promulgation of definitions and standards for foods which will have the force and effect of law is authorized.

The prohibition of added poisons in foods or the establishment of safe tolerances therefor is provided for.

The operation of factories under Federal permit is prescribed where protection of the public health cannot be otherwise effected.

More effective methods for the control of false labeling and advertising of drug products are provided

More severe penalties as well as injunctions in the case of repeated offenses, are prescribed

Misbranded if container is so formed, made or filled so as to mislead purchaser

Misbranded if it is an imitation of another drug

Bonds for factory inspection where drugs are prepared, compounded, stored or packaged

Continues the liability of corporation officers individually as well as the corporate body

Requirements for prohibition of formula on labels

Also it is contemplated by some of our legislators to amend the bill to provide that labels must be trade-marked or trade marked and registered

It is the hope of this committee that this body (the A P H A ) will use its best efforts to the end that the physician's prescription filled or compounded by the pharmacist shall be exempt from all requirements of the Pure Food and Drugs Act

During the past year the Department of Agriculture started actively to educate the pharmacists of the country by personal visit and inspection, on the requirements of the Caustic Poison Act. It was found that only in isolated cases were the Caustic Poison labels of the pharmacist in accordance with the law. They were directed to provide the proper labels. It might be stated here that Liquid Phenol comes under this act, but also it is considered subject to the insecticide law. Therefore, the inert part of Liquid Phenol or water must appear on all labels when dispensed by the pharmacist and in some states the name and the address of the drug store must appear on the proprietary package.

The Administration Beer Bill, as you know, passed Congress on March 16th of this year. We of the A P H A sought to have incorporated the feature that beer could not be sold where drugs and medicines are compounded and sold.

In January of this year, Representative Celler of New York introduced a bill amending the National Prohibition Law so as to remove the causes of resentment in it by the physician. This bill was finally passed and your representatives met with Dr. Doran and others affected by this legislation for the purpose of submitting and criticizing necessary regulations for its operation. We succeeded in having eliminated from the part applicable to pharmacies the onerous features of record keeping. As the legislation is now the law and in operation, each of you who dispenses medicinal liquor realizes the relief you have obtained and the possible increased monetary return.

In the last months of 1932, the million dollar committee, after 5 years of work and study, made this report on the Costs of Medical Care. Most of you are acquainted with the socialistic features which the report contained. If nothing is done by the pharmacists to counteract the influence created by this report then they will find themselves legislated out of business. For your information, the following are the salient points of the report:

(1) That medical service both preventative and therapeutic, should be furnished largely by groups of physicians, dentists, nurses, pharmacists and other associated personnel

(2) The extension of all basic public health services

(3) That the costs of medical care be placed on a group payment basis, through use of insurance and taxation or both

(4) That the study, evaluation and coordination of medical service be considered important functions of every state and local community through agencies

(5) That professional education be given necessary emphasis

(a) To physicians for public health and prevention of disease, and restriction to specialization

(b) That dental students be given a broader background

(c) That pharmaceutical education place more stress on pharmacists' responsibilities and opportunities for public service.

(d) That nursing education be thoroughly remodeled



- (e) That competent nursing aids be provided
- (f) That adequate training for midwives be provided
- (g) For the systematic training of hospital and clinical administrators

The biggest item of legislation that has been presented to the country in years is the recently adopted National Industrial Recovery Act. In President Roosevelt's radio talk of May 4, 1933, he stated that something had to be done to stop the 10% of an industry from disrupting the business of the other 90%. Therefore, the relief and remedies that the Capper-Kelly Bill sought to attain have been somewhat incorporated in the Industrial Recovery Act. The public has been headlined on this legislation to such an extent that it is unnecessary to detail its features herein, except to impress upon the pharmacists of this United States that they codify their rules as retailers and not in conjunction with wholesalers and manufacturers or both. Such a code has been adopted and presented to the Government for its approval.

During the past year, the actual work in the field service of the St. Louis Drug Store survey was completed. During the year, several bulletins have been published detailing various features of the work. To date, the final summation of the work has not been finished, and with the conditions in the Department of Commerce as they are, no date can be given as to when the final and complete findings will be available. But enough has been completed for the inquisitive to work with. In fact, the directors of the survey are now putting into practical use the findings of the survey by analyzing and revamping three of the Whelan stores in Washington. Inquiry reveals that after the physical changes were made and each store made a special outlet for a certain line of endeavor, the business of these stores immediately increased. This is proof that the information gathered in St. Louis is applicable elsewhere and therefore valuable if studied and used.

Finally, during the last session of the Congress of the former administration, supreme efforts were made by your president and others to get the Capper-Kelly Bill on the floor of the Senate. Dates were set, promises made and Congressmen obligated, yet, due to pressure of others, in Congress and out the bill was always deferred for what was considered more important legislation. By the 4th of March 1933, when the Congress went out of existence, the said bill had not been presented for a vote. This Congress did absolutely nothing for the drug trade and pharmacy. The Capper-Kelly Bill and the various Nye Bills got nowhere, or rather no further than the calendar of the Senate.

*Chairman* A. V. BURDINE,  
L. F. BRADLEY,  
FRED CAMPBELL,  
M. G. GIBBS

---

## REPORT OF THE CHAIRMAN OF THE PHARMACEUTICAL SYLLABUS COMMITTEE

BY J. G. BEARD, CHAIRMAN

Several valid reasons make impossible my personal presentation of this report. Dr. H. M. Burlage, a member of the Committee, has kindly agreed to submit it for me.

The Fourth Edition of the Pharmaceutical Syllabus was released for sale on January 3, 1933. Several disappointing delays for which I was not entirely responsible prevented earlier publication. These included procrastination, disagreements and the general confusion about what should be included in the new four-year course. Advance notices of the availability of the new edition appeared in the drug press and also in post card announcements from my office to all persons presumably interested in its purchase.

The revision of the Syllabus extended over a five year period. Efforts were made by me, as the new chairman to carry through expeditiously a program of revision that represented in my judgment a wise procedure. This procedure differed materially from any theretofore employed in the following respects:

1. A system of nomenclature was set up that seemed in accord with present usage.
2. The arbitrary classification of the subject matter into the three divisions of pharmacy, chemistry and materia medica was discontinued through belief that it is now an obsolete classification.

3 The several outlines were presented alphabetically under a scheme that divided the subjects into two main classes, namely Professional and Applied Subjects and Basic Subjects. The first class was outlined in the form of syllabi, the second was simply listed with the stipulation that they must really be basic, not applied and must be of standard college grade. The subjects in both classes were indicated as "Required" or "Optional," and the number of didactic and of laboratory hours was specifically set forth. The arguments and reasons for this general plan are given in the new Syllabus and need not be repeated here.

4 A new section was created entitled "State Board Examinations" that disregarded so called "Model State Board Questions" and dealt instead with discussions, suggestions and general information covering the principles of examining candidates for license.

5 The work of revision was not limited to members of the Committee but help was drawn freely from any source that seemed to promise expert and specialized assistance. Every section of the nation was represented in this call for "outside" help. So much for departures from previous customs.

Early in the work of revision it was decided to create an executive committee. A representative from each of the sponsoring bodies together with the chairman, composed the committee. The AMERICAN PHARMACEUTICAL ASSOCIATION was represented by Dean R. A. Lyman, the Colleges by Dean T. J. Bradley, and the Boards by Mr. A. L. I. Winne. Later Subcommittee chairmen were named. Prof. E. Fullerton Cook was chosen for Pharmacy subjects, Dr. Glenn L. Jenkins for Chemistry, Dr. H. M. Burlage for subjects that in many catalogs fall under the head of Materia Medica, and Dr. Robert P. Fischelis for Cultural and Basic Subjects. The latter group met together in Baltimore last August for the purpose of examining all outlines and to prepare a formal set of recommendations for the meeting of the entire Committee which was held just prior to the Toronto convention. During a 2 day session at Toronto at which sixteen of the twenty one members were present the entire manuscript was studied, the recommendations of the subcommittee were considered, certain additions, deletions and modifications were ordered and final authority was given the Chairman to proceed with several tasks that had to be completed before publication could be started.

Immediately after the Toronto meeting bids were sought from five printers familiar with pharmaceutical terminology. When the bids were opened it was found that the Lord Baltimore Press of Baltimore, made the lowest and most satisfactory bid and this firm was therefore awarded the contract for printing the new edition.

At this point I want to quote the first paragraph of the Preface to the Fourth Edition.

The Pharmaceutical Syllabus is intended to indicate the subject matter that schools of pharmacy may profitably teach, and to set forth that portion of the subject matter which should be required and that portion which may be looked upon as optional, as well as to indicate the minimum amount of time that should be spent in presenting such material to students. The Syllabus is intended also as a guide to state board examiners in that it indicates the nature and extent of professional and applied knowledge that may have been included in the training of the graduate in pharmacy. The Syllabus is not designed to interfere with such flexibility in courses of study and freedom in methods of instruction as ought to exist in schools of pharmacy but rather its purposes are (1) to present the essentials that should be included in college curricula, (2) to outline subjects of a professional or applied character in such a way as to foster a degree of uniformity which will tend to equalize the training of pharmacists sufficiently to assure their professional capability irrespective of the geographic location of the teaching institution or its educational policy, and (3) to give in the several outlines such attention to detail as will guide boards in framing their examinations. In short the plan and scope of the work contemplate a series of suggestions and outlines that may serve as a rational basis for instruction and that will afford scientific tests to determine the fitness of applicants seeking license as pharmacists. It is readily apparent that such an effort must invite more or less of compromise. Quite possibly this is not the syllabus that any one person—teacher or examiner—would write, but since it is the well considered product of a group of earnest and representative pharmacists, teachers and examiners, it is doubtless better balanced and more acceptable than the work of a single mind could be."

The new edition was advertised thoroughly but in spite of this fact only 184 copies have been sold up to this time. Certain reasons may be advanced to explain this small sale. (1) The appearance of the Syllabus after the four-year course had gone into effect, (2) the lowered pur-

chasing power of those to whom the book should offer an appeal, and (3) an apparent lack of interest on the part of college and board members in a book that has no standard rating no compulsory status, and which has no supporting group that will accept its suggestions and curricula as a part of its working formulas. The last of these reasons is to my mind the most potent one and one that calls forth the following declaration that has no spirit of animus in it.

The Pharmaceutical Syllabus should be given an official status and a limited power to control courses in pharmacy and be given also the active support of its sponsoring bodies, or else it should be discontinued as having no longer a value commensurate with the labor and expense that are involved in every revision. Almost fifty persons gave freely of time, thought and specialized energy to bring the fourth edition into being. If the product of their labor is judged to be inferior the fault rests squarely upon the chairman who failed properly to coordinate and present the wealth of material that his co workers submitted. But and this is the point even if the fourth edition had measured up to all expectations it still would have been just another book to add to the literature of pharmacy, whereas it should have been officially adopted in no mere formal sense, as a guide to curriculum building with the understanding that its sponsoring bodies had accepted its suggestions as to what should constitute the minimum hours of required subjects to be taught, together with the principles that should underlie the framing of state board examinations. This is not to say that the Fourth Edition or any subsequent edition should bind any college or any board to follow specifically or entirely the recommendations of the Syllabus, but it is to say that unless the minimum requirements set up in any Syllabus are adhered to and its working principles adopted, such failures should be viewed with disfavor by the bodies responsible for the Syllabus. Either this should be done or a new chairman appointed or else no future group of revisionists should be asked to labor in a profitless and thankless undertaking.

I wish in conclusion to say that a financial report is attached hereto, and to express my deep appreciation to the members of the Syllabus Committee for their unstinted support and to those many persons unconnected with the Committee who shared in the labor of revision.

(Signed) J G BEARD *Chairman*

#### FINANCIAL REPORT OF J G BEARD CHAIRMAN FROM AUGUST 1 1932 TO AUGUST 1 1933

##### *Receipts*

Cash Balance on Hand Beginning of Year		\$ 512
Contribution for 1932 from A A C P	\$50	
Contribution for 1932 from N A B P	50	
Contribution for 1932 from A Ph A	50	150
Sales of 184 Copies of Fourth Edition of Syllabus		373
		<hr/>
Total Receipts		\$1035

##### *Disbursements*

Traveling Expenses of Sub Committee Chairmen to Baltimore Meeting		
E Fullerton Cook	\$ 8 19	
Rob t P Fischels	15 68	
Henry M Burlage	21 95	
J G Beard	26 45	
Glenn L Jenkins	00 00	72 27
Mimeographing Letters and Forms		19 50
Telephone and Telegrams		6 35
Binding Minutes of All Committee Meetings		2 75
Stationery Forms, Miscellaneous Printing		22 60
Lord Baltimore Press Printing 1000 Copies of Syllabus and Binding 500 Copies		585 40
Freight on Syllabus Shipment		4 05
Shipping Boxes for Mailing Syllabus and Freight and Drayage		22 18
Printed, Gummed Labels for Mailing Shipments		3 17
Office Supplies for the Year		18 30
Secretarial Assistance over Two Year Period		60 00

Cost of Copyright on Syllabus, 4th Ed	2 25
Postage for All Purposes and Insurance Fees	73 00
Total Disbursements	\$ 891 82
Cash Balance on Hand August 1, 1933	\$ 143 18
Complimentary Copies Mailed to All Members of Committee, to All Authors Who Assisted in the Work of Revision, to the Drug Press, to Copyright Office, to American Council on Education and to Several Foundations Interested in Education	75
Copies Sold	184
Bound Copies on Hand	231
Unbound Copies Held by Lord Baltimore Press for Later Binding	500

### ABSTRACTS OF PAPERS OF SCIENTIFIC SECTION, A PH A

"What Is an Important Drug?" by L K Darbaker —In connection with pharmaceutical and medical education a question arose regarding the most important drugs Pharmacists, teachers, physicians and hospitals, all scattered through the United States were asked to list the fifty drugs they thought were most important Replies were variable, some covering fifty groups of drugs such as mercury compounds, whereas others listed specific drugs such as mercurous chloride The first figures in the tabulation, following each drug name represents the votes in terms of percentage from pharmacists and teachers and the second number shows the votes in terms of per cent from physicians and hospitals

"Some Western Pennsylvania Plants Which Have Been or Are Being Used in Medicine," by L K Darbaker —For many years it has been the custom of the writer to record the names of the Western Pennsylvania plants which have been used in the treatment of disease This paper represents the summary of this information Although almost every plant has at some time been used as a medicine, only those plants which have been extensively used are listed The overlapping of the various flora makes Western Pennsylvania especially rich in plant life, of these many plants 259 are listed as being used medicinally The first names indicate the botanical source (genus and species), the second is the name under which the plant is or was official or commonly known, and the third is the synonym or common name

"Further Studies on Psyllium Seed," by Heber W Youngken —Plants grown by writer from commercial seed labeled "Spanish Psyllium" were compared with authentic herbarium specimens in the Gray Herbarium of Harvard University, and with descriptions The identity of the material was traced to *Plantago Psyllium* L Some French Psyllium seed has been found to be yielded by *Plantago arenaria* W & K The distinctions between the plants, flower parts and the swelling factor of the seeds are given

"A Study of the Constituents of Siam Benzoin in Relation to Their Preservative Action on Lard," William J Husa and Donald E Riley —The present results show that coniferyl benzoate is the constituent of Siam benzoin which reduced the rate of development of rancidity in lard The other constituents of Siam benzoin, *l e*, benzoic acid, siarasinolic acid, cinnamyl benzoate and vanillin have no appreciable preservative effect in the concentrations present in benzoinated lard

"The Leaves of *Pentstemon cobæa*, Nutt," by Loyd E Harris and Ruth Ann Conner —*Pentstemon cobæa* Nutt is commonly known as Beard tongue, *Cobacea* and *Balmona* It was found in Arkansas by Nuttall in 1833 and is still widely distributed from Missouri to central Texas It is of pharmaceutical importance due to the fact that it has been used, principally as a tea, for the prevention and cure of "the chills" in malaria It is also said that the Chickasaw Indians used it as a cathartic The experimental work was done on the dried leaves, which is the part of the plant used as medicine Using a modified Dragendorff method of extraction with selective solvents the alcohol extract was found to be 16.34 per cent and the water extract 18.89 per cent of the total weight of the leaves White crystals having a melting point of 163° C were obtained from the alcohol extract They did not reduce Fehling's solution before or after hydrolysis Sulphur, nitrogen and the halogens were not present in the molecule Infusions and decoctions were prepared and studied

# THE SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

ABSTRACTS OF THE MINUTES OF THE SESSIONS HELD IN MADISON, AUGUST 21 TO SEPTEMBER 2, 1933

(See also brief summary in reports Final Session, House of Delegates, printed in the October JOURNAL—titles of papers will be given in the minutes, discussions, if any, will be printed when paper is published, if not included in the minutes. The Editor will be thankful for corrections of errors.)

## SCIENTIFIC SECTION

The First Session of the Scientific Section was called to order by Chairman W. J. Husa on Wednesday, August 30th, at 2:00 o'clock. The Chairman requested Vice Chairman F. E. Bibbins to take the chair while he read his address. The Chairman's Address follows.

### THE CHAIRMAN'S ADDRESS

BY WILLIAM J. HUSA

Meeting as we are this year in one of the centres of pharmaceutical research and with the spirit of a Century of Progress about us, we have the proper atmosphere and the proper setting for a very successful meeting. In this day every profession worthy of the name must be able to show a consistent development from year to year. Every new fact or principle discovered in the field of pure science may have many important applications. One of the functions of the research man in the professions is to consider new scientific developments from the standpoint of his own field, and to correlate, adapt and develop them into a form in which they can be used by his profession in the service of the human race. For many years our Scientific Section has had a wonderful influence in promoting and diffusing scientific research in pharmacy and I trust that each of you will find here new knowledge and new inspiration.

During the past year, your officers and committees have been actively engaged in looking after the affairs of the Section. On matters coming within their jurisdiction, the officers have taken positive, constructive action, and on other matters recommendations have been brought here for consideration by the Section.

*Number of Sessions*—At the Toronto meeting the question was brought up of either adding an extra session of the Section, or holding the meeting in two divisions. Due to the large and increasing number of papers offered it appeared that something should be done along this line. The proposition of breaking up the section into divisions has certain complications and it was not considered advisable to attempt this without having had definite previous consideration by the Section.

However, the plan of holding an additional session seemed feasible. In some former years, the Scientific Section had three sessions in addition to the joint session with the Section on Practical Pharmacy and Dispensing but for the last three meetings one session was discontinued in order to simplify the general program of the A. P. H. A. and to lessen the conflicts with meetings of other sections. Your officers felt that in view of the 103 papers on the 1932 program of this Section, of which 54 were actually read, it was imperative to return to the plan of three sessions plus the joint session. Accordingly, a request for an extra session was placed before the proper authorities of the Association. After correspondence concerning all the factors involved, the request was granted. The extra session has been placed on Thursday morning with the idea that it would be easier to maintain interest if one session each day, from Wednesday to Friday were devoted to scientific papers, in addition to the joint session on Thursday evening.

*Joint Session*—During the negotiations concerning the addition of the extra session, consideration was given to the advisability of breaking up the Joint Session of the Scientific Section and Section on Practical Pharmacy and Dispensing into separate sessions. Although such a move would gain time, it appears that the joint session has a real function to perform, *i. e.*, to make the "scientific" members more practical and the "practical" members more scientific by bringing them together on common problems.

In past years the committee reports at the joint sessions have often taken so much time that it has been necessary to greatly shorten or postpone the papers and illustrated lectures of general interest. The committee reports and discussions have been well worth while but some limitation of time must be inaugurated and enforced in the interest of orderly procedure.

**Recommendation 1**—It is recommended that the maximum time allowed for presentation of committee reports at the Joint Session of the Scientific Section and Section on Practical Pharmacy and Dispensing shall be as follows: U S P Report, 20 minutes, N F Report 15 minutes, other committee reports 10 minutes. The total time allowed for discussion of each report shall not exceed 10 minutes.

**Divisional Meetings**—The congestion of our programs has led to occasional suggestions that the number of papers accepted by the Section be reduced. Some have placed this on the basis of refusing papers having little bearing on pharmacy, while others have suggested that too many papers should not be accepted from one source. While it would be desirable to refuse papers which are definitely outside the scope of our Section, I feel that this principle should be applied with caution. Papers on pure science need not necessarily be rejected provided the research was carried out in pharmaceutical colleges or establishments with the idea of ultimate application to pharmacy, if such papers are driven elsewhere sometime it will be said that pharmacy has been robbed of credit for work done by pharmacists. The idea of not accepting too many papers from one source is also unsound, by so doing we would be hindering the development of pharmacy.

The additional session which has been granted should do much to relieve the congestion of scientific papers whose presentation should certainly be encouraged. It would be wise however at this time to make definite plans to be put into effect by the Section officers during any future year when the sessions now provided become inadequate. Since further sessions could hardly be arranged we must look in the future to the plan of holding simultaneous group meetings. Many have said that they would dislike seeing the Scientific Section broken up into two or more independent sections. As far as I have observed there is no demand and no necessity for such a move. It is entirely practical to continue to function as one section in all matters pertaining to the business affairs of the section, but to break up some of our sessions into two or more divisions for the reading of papers, each division to be presided over by one of the regular section officers. This plan has been successfully used for years by the Division of Physical and Inorganic Chemistry of the American Chemical Society. This division has only two officers, a chairman and a secretary, each of whom presides over one of the group meetings which are held in adjoining rooms, so that the members may move freely from one group to the other. We should give the officers of the Section authority to break up one or more of the sessions into two or more divisions as may be necessary to accommodate all the papers accepted in any given year. Each year at least one session might be held in which all members would join to hear more important papers or those of more general interest as selected by the officers. Such a plan would be flexible, during the middle of the week when attendance was heavy the divisional meetings could be scheduled while on Friday with diminishing attendance only one program need be provided.

It is provided in Chapter VI, Article I of the By-Laws of the Section that additional sessions may be held when the officers of the Section may see fit with the consent of the Council.

**Recommendation 2**—It is recommended that the officers of the Scientific Section be authorized to make arrangements, in any future year, with the Committee on Standard Program and Council for holding one or more of the meetings of the Section in two or more divisions, which would meet simultaneously for the reading of papers classified into groups by the officers, each division to be presided over by a regular officer of the Section.

I feel that the above plan is practical and that it is not only correct in principle but has the necessary flexibility to meet any situation. Whenever desired one of the group meetings could be devoted to a symposium on one certain topic merely by proper classification of papers.

**Arrangement of Program**—At the Toronto meeting action was taken by the Section requiring authors to indicate whether papers would be presented in person or by title. It is customary to include all papers on the printed program but papers presented by title might well be grouped at the end of the program of the section. Members are requested to cooperate fully with the secretary by indicating in each case how the paper is to be presented. Where a member presents a number of papers it might be well to read only the more important ones and to designate the rest "by title."

There has been some suggestion that our Section might operate on a definite time schedule, indicating on the program the exact time when each paper is to be presented. This plan is used by some associations and is very advantageous when it works as planned, but 100% cooperation is needed for proper functioning. Under such a plan it is possible to keep from falling behind schedule by not allowing anyone to exceed the allotted time. When the meeting gets ahead of schedule the excess time may be used for discussion of any previous paper, thus avoiding the calling of any paper ahead of the scheduled time. Probably our Section is not quite ready for such a plan, but we may work toward it by taking up the papers in the order in which they appear on the program.

For the present year I have favored a plan, to which the secretary has graciously acceded, of putting the papers on the program approximately in order of receipt of the abstracts, thus having some papers at each session from each of the various branches, if they happen to come in that way, but not putting any one person on the program for more than two papers until every one else has been put down for one or two papers. Authors submitting a number of papers were allowed to designate an order of preference, thus the extra papers are placed at the end of the program to be taken up if time permits. If some papers must be left off on the last day it will tend to be only the less important papers of the prolific contributors. I thought that for any one session, the papers might be classified somewhat, but we would have each day a little more variety which might stimulate interest and hold attention. In this way, a person who can only be present at the Wednesday session can hear some papers in each field while if all the papers were outside the field of such a person, he might not even stay for Wednesday.

*Manner of Presentation*—Another matter which was left with the officers was the suggestion that authors often attempt to give too many details in the time allowed leading to a hasty presentation in which important points are obscured. In the notices calling for papers the officers mentioned this matter and suggested that the following method of presentation be followed as far as possible:

(a) A brief statement as to purpose and scope of investigation

(b) A statement of general methods omitting details except those of particular importance

(c) General statement of results and conclusions

If the Section wishes to continue this plan after this year's trial, appropriate action should be taken.

*Suggestions to Authors*—You are probably aware that for financial reasons it has been necessary for the ASSOCIATION to make some reduction in the number of pages in the JOURNAL for 1933. Authors of papers should cooperate during this emergency by striving to develop a condensed style. In some cases space can be saved by publishing typical data in full with the remainder in summarized form, in other cases less space need be given to negative results preliminary results and duplications of previous work. Reviews of earlier work may be largely omitted in cases where adequate summaries are already easily accessible. We should cooperate with the editor by cutting down the length of articles wherever possible. This does not refer only to long papers since we know that a short paper with little in it might be a better target for the pruning knife than a longer article based on a great deal of research.

Regardless of whether a paper is presented in person or by title, the complete paper should be in the hands of the secretary at the time of the meeting. I am informed that quite a number of papers which appear on our printed program are not turned in until several months or more after the meeting. Of course this could be prevented by requiring that all papers in completed form be in the hands of the secretary before the list is drawn up for the printed program. I hesitate to make such a recommendation because it would cause inconvenience to many authors who have never been at fault in this respect. I prefer to appeal to the members to always see that their papers are in the hands of the secretary at the time of the meeting. If this appeal does not largely eliminate this condition the Section may later well consider restrictive measures which would apply only to those who show themselves to be chronic offenders in this respect.

I feel that some of the research work reported before our Section would be very suggestive and very helpful to physicians. In some cases the conclusions go as far as the pharmaceutical research worker can go without encroaching on the medical field and if the results were made available to physicians and medical research workers it would often give them a point of departure

for medical research. It has seemed to me that as a whole the medical profession is uninformed and unappreciative of the commendable research program of pharmacy. The average physician does not hear of any pharmaceutical research except through the detail men. One reason for this situation is that the JOURNAL OF THE A. P. H. A. does not appear on the list of journals abstracted by the *Journal of the American Medical Association*. On one occasion I received a number of requests for reprints of one of my papers from medical men who happened to see the article or hear of it. This led me to take up the question with Dr. Fishbein, Editor of the *Journal of the American Medical Association*, as to whether his journal would not be rendering a useful service to medicine by including brief abstracts of such pharmaceutical articles as were deemed of value by the medical abstractors. Dr. Fishbein replied that it did not seem possible for them to undertake to list each issue of our JOURNAL and abstract all the articles but that they would be glad to abstract or comment on occasional contributions from our JOURNAL and he added that he would publish an abstract of the article which I had sent him as an example. These considerations lead me to suggest that members make it a point to send reprints of such of their papers as clearly have medical applications to medical journals, some of these may be abstracted, thus aiding in making a start in placing pharmaceutical research properly before the medical profession.

*Suggestions to Association in Publication Matters*—The best means of maintaining and increasing the professional standing of pharmacy is an active research program. However, research loses much of its value if facilities are not available for prompt and adequate publication. People sometimes view publication too much from the standpoint that the author may be seeking publication for selfish reasons. On one occasion a noted Italian investigator isolated certain constituents from a drug and announced his discoveries in a prominent European journal. A little later another worker came forth with a claim to priority, indicating that he had previously published the same results in an obscure Scandinavian periodical. In acknowledging priority, the Italian said that not self love, but love for his colleagues, should cause the research man to publish his important results in a journal of general circulation.

The publication program of our ASSOCIATION must keep pace with our scientific and professional progress, and some method should be found to release the brakes of financial recession. If the regular sources of ASSOCIATION funds are insufficient, consideration might well be given to securing assistance by special endowments and by contributions from pharmaceutical manufacturers. It would be to the interest of pharmaceutical industry to support the publication of scientific pharmaceutical articles. We know that manufacturing is shifting from tinctures, fluid extracts, elixirs, etc., to specialties, and if the distribution of specialties is not to degenerate to a patent medicine level, everything possible must be done to maintain pharmacy on a high professional level, and nothing will contribute as much to this end as a strong program of research and publication.

**Recommendation 3**—Since the best means of maintaining and increasing the professional standing of pharmacy is an active research program, which necessitates adequate facilities for publication, it is recommended that the Council consider the advisability of seeking contributions from pharmaceutical manufacturers and special endowments to support an adequate publication program for the increasing scientific and professional contributions of our ASSOCIATION.

In 1932 there were 1362 pages of text in our JOURNAL and among the other pages devoted to advertising and other material I find that about 110 pages were devoted to publishing the monthly list of officers and committees of the ASSOCIATION and its sections, and of state boards of pharmacy other associations, etc. The use of 110 pages for printing the same list from month to month hardly seems justified, the space could well be used for other purposes.

**Recommendation 4**—Since during 1932 about 110 pages in the JOURNAL OF THE A. P. H. A. were devoted to publication of names of officers and committees of various organizations, it is recommended that the Council consider the advisability of saving space by publishing the names of only the main officers of the ASSOCIATION and sections each month, with the remainder of the names to be published only two or three times a year on a rotating schedule, with a note each month referring to previous issues for lists of other officers and committees.

Under the rules, Recommendations 3 and 4, if adopted by this Section, should be referred to the House of Delegates which in turn is to refer them to the Council.

In closing I wish to express my thanks to every one who aided the Section during the year and particularly to acknowledge the kind coöperation of Secretary L. W. Rowe and First



Vice Chairman F E Bibbins of our Section and Secretary E F Kelly of the Association I also wish to thank the members for the honor conferred on me by electing me chairman of the Section, it has been a pleasure to serve you

Following the usual order, Vice Chairman Bibbins appointed the following Committee on the President's address *Chairman*, J C Krantz, Jr, George D Beal and G L Webster

## THE SECRETARY'S REPORT

BY L W ROWE

### *Members of the Scientific Section American Pharmaceutical Association*

This year it was deemed wise to send out but one general notice to the nearly 300 names on the mailing list of the Scientific Section and this was done early in February The response as you can see by the listing of nearly 100 titles on the printed program was very good—perhaps too good for the time at our disposal We were able to obtain permission to hold an extra session of the Section this year and that will materially help our situation

The cooperation of the members and particularly of the other officers of the Section has been very helpful and is greatly appreciated

Respectfully submitted,  
L W ROWE, *Secretary*

Chairman Husa called for the Report of the Committee on Monographs It was read by Chairman E E Swanson (Printed on page 1196)

The Report of the Board of Review of Papers was called for Secretary Rowe made a brief report stating that progress was being made and he felt that with cooperation further advance will be made

Chairman Husa appointed the following Committee on Nominations *Chairman*, E D Davy, E E Swanson, F F Berg

No further committees reported at this time

Chairman Husa announced as the next order of business the reading of papers He requested that on account of the large number of papers that anyone desiring to discuss the paper should rise promptly and have the discussion as brief as possible

The following papers were presented

"A Modified Assay Process for Alkali Benzoates and Salicylates," by Jacob E Schmidt and John C Krantz, Jr (No discussion) Printed in October JOURNAL, page 953

"Isolation and Identification of Sucrose from Senega," by Ralph Bienfang, read by Loyd E Harris (No discussion)

"The Gravimetric and Volumetric Determination of Antipyrine as Hydroferrocyanide in the Presence of Amidopyrine" by I M Kolthoff (No discussion) Printed in the October JOURNAL, page 947

"The Gravimetric and Volumetric Determination of Brucine and Strychnine as Dichromate," by I M Kolthoff (No discussion)

"The Determination of Strychnine and Brucine as Hydroferrocyanides and Their Separation by Means of Ferrocyanide," by I M Kolthoff (No discussion)

The three foregoing papers were presented by Charles V Netz

"The Barbituric Acid Derivatives as Drugs," by J H Graham (No discussion)

"Tincture of Digitalis," by L W Rowe and W L Scoville (No discussion)

The following papers were presented by title

"Two Species of Genus *Ledum*," by Russell A Cain and E V Lynn

"What Is an Important Drug?" by L K Darbaker

"Some Plants of Western Pennsylvania Which Have Been Used in Medicine," by L K Darbaker

"Some Poisonous Plants of Western Pennsylvania," by L K Darbaker

"The Micro Projector," by L K Darbaker and Samuel H Oswald, Jr

The following paper "Licorice Fern and Wild Licorice and Substitutes for Licorice" by Louis Fischer and E V Lynn, was read by E V Lynn (No discussion)

Detection of Small Quantities of Carbon Monoxide in Medicinal Oxygen " by Jacob E Schmidt and John C Krantz Jr

Arthur Osol inquired whether Dr Krantz had used palladium chloride for the detection of carbon monoxide In its application a paper is impregnated with palladium chloride—the presence of carbon monoxide causes reduction

The author stated that the latest chloride method is that of the British Pharmacopœia but that he had not found it as sensitive as the method described

The next paper 'Further Studies on Psyllium Seed ' was read by Heber W Youngken (No discussion)

L W Rowe presented a paper on 'Fludeextract of Ergot,' by L W Rowe and W L Seoville (The paper is printed in the October issue page 938)

The paper on 'The Hyperglycemic Action of Forty Amines,' by Robert C Anderson and K K Chen, was read by Robert C Anderson

The following papers were read

'The Value of Senecio in Medicine,' by Edgar A Kelly and E V Lynn (No discussion)

'A Study of the Constituents of Siam Benzoin in Relation to Their Preservation Action on Lard,' by William J Husa and Donald E Riley (No discussion)

'The Leaves of Pentstemon Cobæa Nutt ' by Loyd E Harris and Ruth Ann Conner (No discussion)

The following paper was read by the author 'A Comparative Study of the Maryland and the Official Sennas ' by Frank J Slama

Heber W Youngken after inquiring about some of the characteristics said that the paper was a very good one offering some excellent facts in segregating the genus however, he was not certain that sufficient differential characteristics had been brought out to make a new genus of the group The author stated that this was only a suggestion Dr Youngken said the author had made a valuable contribution in morphology, which is bound to help the taxonomy The author stated that this was only the first part of the work and he had obtained some gratifying results In the second part the author is working on the whole plant he is studying cross sections of all parts of the plant

The next paper called for was on 'A Comparative Study of Five Assay Procedures for Opium ' by A R Bliss, Jr, E D Davy Joseph Rosin, W H Blome, R I Grantham and R W Morrison (The paper was not read)

The next paper was on 'The Water Content of Magnesium Oxide,' by Jacob E Schmidt and John C Krantz Jr (No discussion)

The following papers were presented by James C Munch

Antidotes I General Plan, ' by F E Carlough and James C Munch, Antidotes II Barbituric Acid Compounds as Antidotes for Strychnine Poisoning " by D A Spencer and J C Ward Antidotes III The Present Status of an Antidote for Thallium Poisoning, ' by James C Munch J C Ward and F E Carlough

Win Gray inquired what importance Dr Munch placed on catheterization of strychnine The author replied that as far as effect on humans is concerned it was valuable, but in so far as the effect on animals is concerned it is impracticable because, when called in the animal is about ready to die Catheterization by gastricavage is useful but too slow

The next paper was on 'The Co Fe Cu Fluids as Applied to U S P Tests " by H V Army and A Taub (No discussion) Published in October JOURNAL pages 956-961

The next paper 'The Colorimetric and Electrometric  $p_H$  Determination of Solutions of Certain Alkaloidal Salts,' by Allen F Peters and Arthur Osol (No discussion)

Chairman Husa announced that the next session of the Scientific Section would convene promptly at 9 00 o'clock in the Pomperan Room instead of in the Crystal Room

This completed the First Session of the Scientific Section

## SECOND SESSION

The Second Session of the Scientific Section was convened by Chairman W J Husa, Thursday August 31st at 9 00 o'clock The first three papers, 'Tincture of Stramonium Seed Free from Plant Dirt ' ' by Ralph Clark and Edward Kremers 'Percolation Studies, Continued,' by M Wruble and Edward Kremers, 'The Percolation of Drugs Mixed with Calcium

Hydroxide," by M. Wruble and Edward Kreniers, were announced by Ralph W. Clark as not ready for presentation.

The next paper, "A Study of *Impatiens* Species and Their Pharmaceutical Preparations in the Treatment of Poison Ivy Poisoning," by C. H. Rogers, was not submitted.

The authors of the next two papers, "The Volatile Oil of *Chrysanthemum Balsamita*," by Ralph Voigt and E. B. Fischer, and "A Camphor-Like Constituent of *Balsamita Vulgaris*," E. B. Fischer were not present for presentation of their papers.

The next paper on the program, "The Standardization of Ergot, a Comparison of the British Pharmacopoeia Assay for *Extractum Ergotæ Liquidum* with the Modified Smith Colorimetric Assay," by Asa N. Stevens, was presented by the author. (It is printed in the October Journal, page 940.) It was discussed by Messrs. James C. Munch, G. L. Webster, S. H. Culter, F. O. Taylor and the author.

Replying to James C. Munch, the author stated that ergotoxime ethanesulphonate and ergotamine tartrate are identical in color value. Theoretically there is a difference in the relative amount of base present in each salt. However, in making these determinations it has been found that their color values are the same.

In reply to G. H. Webster, the author explained that Table I, of the paper, gives the results from ten determinations while Table II contains the results from more. Individual determinations vary from zero to twenty per cent. A great many more determinations have been made while comparing various colorimetric methods with the Broom and Clark and the Cock's Comb Methods of Assay.

Between four and five hundred assays were made during the last three years.

Mr. Stevens said further, no superiority has been claimed for the modified Smith Colorimetric Method. Furthermore, the results have not been selected. The fact that nearly five hundred determinations have been made was mentioned in order to show that a considerable amount of experience has served as the basis for this work.

S. H. Culter inquired whether the author used a catalyzer in producing color?

Mr. Stevens replied that no catalyzer of any sort has been used. Sunlight was the only source of light although the carbon arc has been found to work equally as well. In replying to F. O. Taylor, the author said, "On dark, cloudy days it is necessary to allow for an exposure of from four to six hours. However, this delay may be avoided by the use of the carbon arc on days when the sun is not shining."

Dr. Munch said, "If I am not too optimistic, then I might conclude that the various methods of chemical assay have no advantage over the much maligned Cock's Comb Method."

The next paper on "The Stability of Tissue Extract," by James C. Munch and Arnold Quinc, was presented by James C. Munch.

E. V. Lynn inquired whether the author had any idea what is contained in tissue extract that causes this effect, either as specific substances or as classes of substances. He also asked how this compared with the action of histamine and of acetyl choline.

In response Dr. Munch stated, "The theory which has been developed and reported at the International Physiology Congress in Rome, just as the cells of the suprarenal gland continually secrete epinephrine which is poured into the blood stream and stimulates the sympathetic system, so the cells of the pancreas produce this hormone constantly stimulating the parasympathetic system. The blood pressure and muscle tonus at any given moment are due to the relative balance between epinephrine and tissue extract. Tissue extract coming from the pancreas circulates in the blood stream to the heart and voluntary muscles and the tissues, and eventually it is excreted in the urine."

The paper entitled "The Pigeon as a Hematopoietic Test Animal," by Wm. A. Peabody and R. C. Neale, was presented by W. G. Crockett. James C. Munch thought this a most interesting report, being the latest of the bioassays. He stated that Dr. C. W. Edmunds had been studying the method intensively with a view to suggesting or for consideration in the U. S. Pharmacopoeia.

The next paper was on "An Assay of Hyoscyamus," by Marval D. Evans and Edward D. Davy.

H. G. DeKay stated that they had been working with this assay of hyoscyamus for about 2½ years. They had carried on a long series of experiments with the pure alkaloids and these results verify those of Professor Davy.

"Notes on the B P Colorimetric Test for Ergot," by F A Upsher Smith, was called for James C Munch stated that in the series of samples now being distributed by the Association of Official Agricultural Chemists for comparison of colorimetric assays they have provided a color standard He inquired of the author of the paper whether he knew of it He did not, and A N Stevens stated that the Association of Official Agricultural Chemists had a color standard but he could not recall the name Mr Glycart, associate referee in Chicago, has a blue color standard which he submitted to some laboratories for consideration and experimental work

The following two papers were presented by James C Munch "Alkaloidal Reagents V Dragendorff Reagent," by Frank C Crossley, James C Munch, Walter H Hartung and Harry J Pratt

"Alkaloidal Reagents VI The Aconite Alkaloids," by James C Munch, Harry J Pratt, Walter H Hartung and Frank C Crossley

Dr Munch said, Several years ago, the late Herman Engelhardt started with 250 Gm of chemically pure aconitine He hydrolyzed it to benzoilaconine and part of that to aconine Some of these materials from his original work were obtained for toxicity tests "

'Standards for Tincture Digitalis with Special Reference to U S P X and B P 1932 Standards," by L W Rowe was presented by the author

#### ABSTRACT OF DISCUSSION

James C Munch expressed faith in ouabain as the digitalis standard His experience with the leaf had been unfortunate He reported that the Canadian government laboratory was collaborating with the A P H A committee in tests of tincture digitalis but their results were somewhat higher than his

E V Lynn asked whether anyone else had found undefatted digitalis more active than the defatted leaf and if so what is the explanation?

The author explained that assay results on tinctures from undefatted leaves were more definite and only tended to be higher Inability to find activity in extracted fats made an explanation of such results more difficult

Upsher Smith spoke at some length of work done by Dr Van Dyke of Chicago University which entirely confirmed the results reported in this paper He referred to the defatting of digitalis as an unnecessary procedure which was not now favored by either the pharmaceutical or the medical profession Dr Smith then said that his interest had been aroused in Apocynum by Dr Burn of England and he had planted about an acre of it The roots go very deep and also spread rapidly He submitted a sample of the root to Dr Burn who reported that 29 mg was equivalent to 1 International Unit, making it about  $3\frac{1}{2}$  times as active as digitalis, yet the clinical dose is about 15 grains as compared to  $1\frac{1}{2}$  grains for digitalis He closed with a plea for the adoption of the International Standard Leaf for digitalis to replace the present U S P ouabain

James C Munch took up the defense of ouabain, stating that Dr Burn had never made a U S P test of digitalis Granting that there are certain pharmacodynamic differences between ouabain and digitalis, the same differences exist between apocynum and digitalis Some electrocardiographic work he had done indicated that apocynum was about twice as potent as digitalis on the human One objection to digitalis leaf as a standard is that it must be extracted before its use, whereas ouabain can be used as such

"Assay for the Vitamin B Complex in the Presence of Interfering Substances " Lloyd K Riggs, B J G Chiego, L W Sampson and Annabel Beaty —The paper was presented in abstract by Robert W Rodman

George D Beal presented four papers

"A New Identity Test for Phenobarbital," by George D Beal and Chester R Szalkowski, Notes on the Water of Crystallization of Quinine Sulphate " by George D Beal and Chester R Szalkowski, "An Iodimetric Assay for Organic Nitrites," by George D Beal and Chester R Szalkowski, "A Test for Gelatin in Agar " by George D Beal and Chester R Szalkowski These were discussed by C Jelleff Carr, George L Webster and the author

The following papers were read by title

'The Standardization of Digitalis," by A John Schwarz

"A Study of the Acrylic Amides and Ureides as Hypnotics," by W A Lott and W G Christiansen

The Preparation and Gruncidal Properties of Some Alkyl Derivatives of Hydroxy Diphenyls," by S E Harris and W G Christiansen

"Piperazine Derivatives as Local Anesthetics," by W Braker and W G Christiansen

"Cod Liver Oil Stability of Vitamin A Content under Conditions of Commercial Distribution," by George E Éwe

"Medicinal Cod Liver Oil—Observations on Color and Viscosity," by George E Éwe

The Effect of Ethylene Glycol on the Serum Calcium of the Rabbit," by James M Dille

The authors of the paper on The Arsenic Content of Chondrus," by Charles H LaWall and Joseph W E Harrison were not present

The following paper was read by the author, ' Pancreatin and Its Assay," by F E Willson

The Second Session of the Scientific Section was then adjourned after Chairman Husa announced the meeting for 8 00 o'clock

## JOINT SESSION SCIENTIFIC SECTION AND SECTION ON PRACTICAL PHARMACY AND DISPENSING

The Joint Session of the Scientific Section and the Section on Practical Pharmacy and Dispensing was called to order by Chairman W J Husa, August 31st at 8 00 P M Marvin J Andrews presided as co-chairman

Chairman Husa stated that twenty minutes would be allowed for the U S P report, fifteen minutes on the N F and ten minutes on other Committee reports There would be brief discussion He stated further that after these reports were concluded there were two papers to be presented which were of interest to the Joint Session

The report on the United States Pharmacopœia was called for

In his preliminary remarks Chairman E F Cook stated that it has been a traditional privilege for the Chairman of the Revision Committee to report to this body annually Sympathetic understanding and whole hearted cooperation of the A P H A is important The Chairman read his report, in abstract

### THE UNITED STATES PHARMACOPŒIA

BY E FULLERTON COOK, CHAIRMAN OF THE U S P XI, COMMITTEE OF REVISION

#### THE PROGRESS OF THE REVISION

The Eleventh Revision is progressing normally and the interest and energy of most of the members of the Committee of Revision are such that the best traditions of the U S P are being fully maintained

In this day of change and economic pressure it speaks well for the underlying principles of the Pharmacopœial organization that the Revision has proceeded without reduction in activity or modification of program

#### THE SCOPE OF THE U S P XI

Since announcing the proposed additions and "deletions" at this meeting a year ago many communications have been received from physicians and pharmacists, some approving and others opposing the recommendations These have all been placed in full before the General Committee of Revision and referred to the Sub-Committee on Scope

For the information of those who may be especially interested in this problem, all of these comments have been assembled under the official titles and pasted in a scrap book and this will be on display at the Pharmacopœial Exhibit throughout the week The results of the "Prescription Ingredient Survey," prepared under the direction of Professor Gathercoal, has also been of value in reaching final decisions

As the objective toward which to strive, the General Chairman recently sent the following statement to the members of the Sub Committee on Scope and repeated it to the entire Committee at the Conference held last June

"The Scope of the U S P, from the viewpoint of 'therapeutic usefulness,' does, however, become one of the most important factors in the U S P Revision, and it is this grave responsibility which the Sub-Committee on Scope assumes De

pendent upon the decisions on Scope largely rests the success of the Revision. It is assumed that there are before the members of the Sub Committee the vast array of known therapeutic agents resulting from centuries of empiric medicine and the more recent scientific studies into the clinical and pharmacologic value of drugs. From these thousands of drugs, chemicals and preparations this group is asked to select drugs and medicines of therapeutic usefulness or pharmaceutic necessity, sufficiently used in medical practice within the United States or its possessions.

*Our new Pharmacopœia should therefore include those therapeutic agents which the consensus of medical opinion of to day accepts as of the greatest value and should represent a wide field of application so that theoretically there should be no justification for any physician to step outside the list of U S P XI basic drugs for any treatment of disease which he may be called upon to render.* Furthermore the Pharmacopœial Scope should be such that every medical school would naturally and properly use the Pharmacopœia as the basis of its teaching, so far as treatment is concerned so that the physicians of the country would think primarily of official titles and medicines when prescribing. Its completeness as to scope and efficiency should also be such that in hospital practice few other than official drugs should be employed."

A most earnest and conscientious effort has been made to reach this ideal and when the final list is published it will be accompanied by an explanation prepared by the members of the Scope Sub Committee that all may know the reasons for the more important decisions.

#### INTERIM REVISION

At the last four decennial U S P Conventions authority has been granted for the issuance of Supplements to the Pharmacopœia. The 1930 Convention approved the following:

It is recommended that the Committee of Revision be authorized to prepare supplements to the Pharmacopœia or lists of admissions or changes at any time they may deem such action desirable."

Under the authorization of the 1900 Convention several supplements were issued immediately following the passage of the Food and Drugs Act—in 1906. Another Supplement" was prepared to meet conditions arising from the World War, but the unexpected ending of the War made its issuance unnecessary.

The rapid development of the knowledge of vitamins affecting Cod Liver Oil Standards, and the extensive studies here and abroad dealing with the drug, Ergot have made changes in these texts desirable. The Ergot revision has already been released and the Cod Liver Oil Text is assured within a few weeks.

A third Interim Revision Announcement" will also be issued within a few months covering a number of minor changes which have long been recognized as desirable and were in line for change in the U S P XI but, as an aid to the enforcement of standards under the Food and Drugs Act will be announced now without waiting for the appearance of the new Pharmacopœia.

#### THE NEW COD LIVER OIL STANDARDS

Entirely unforeseen conditions made it necessary for extensive developments in Pharmacopœia activities in the field of vitamins. The need for standards for Vitamins A and D, the establishment of International standards for these and other vitamins and the necessity for the U S P meeting this situation have been responsible for the setting up of a U S P Vitamin Advisory Board "the organization of a group of laboratories to assist in the development of satisfactory vitamin assay methods and the determination of the Vitamins A and D potency of a special Reference Cod Liver Oil." This will be distributed in the United States as the official standard of comparison in assaying new Vitamin A or Vitamin D containing products, both medicines and foods.

In this program, the Pharmacopœia is working closely with the Food and Drug Administration and Dr. Nelson, Director of the Government Vitamin Laboratory is a member of the new U S P Vitamin Board.

We are undertaking a new and difficult program in attempting to coordinate the bio assay

results of seventeen vitamin laboratories all using the new U S P assay method for Vitamins A and D, but the willingness of the vitamin experts of the United States to assist has been a remarkable tribute to the authority and acceptability of the Pharmacopœia and to the liberality of participating groups. Unfortunately the cost of a vitamin assay is large, and without such extensive help from established laboratories this program would be impossible. The Board of Trustees is meeting the cost in two laboratories, but all other check tests have been offered without expense to the U S P.

#### A SUGGESTED DEVELOPMENT IN THE INTERIM REVISION OF THE PHARMACOPŒIA

It seems to be generally conceded that for the Pharmacopœia to fully meet the increased demands placed upon it there should be the revision of texts whenever the need for a change is demonstrated, through newly developed scientific facts. Also it is recognized that, without waiting for the decennial period some newly developed therapeutic agents should find their place in the official standard. Ephedrine and its salts and some of their solutions, also Liver Extract, are illustrations.

The objection to Interim Revisions has been chiefly the difficulty of giving the change the needed publicity and permanent form. To meet this situation it is now proposed that as changes are made after the appearance of the U S P XI they be announced in the medical and pharmaceutical press to become official on January 1st of the following year. Then on the first of each year, a printed supplement to the U S P XI shall be issued, uniform in size with the original volume with each succeeding supplement carrying an index covering all preceding Supplements. To increase the practicability of this plan it is suggested that a spring binder be supplied for these Supplements, the size and appearance being uniform with the original volume. Perhaps at the end of five years the original U S P XI could be reprinted with all supplements included. Another feature will be the inclusion in the back of the U S P XI of a page of coupons. The owner of a book will thus be given the opportunity of filling out the coupon for any of the subsequent annual supplements and obtaining it from the publishers at a nominal price to cover the cost.

If properly carried out this plan will keep the Pharmacopœial text and contents in accord with changing and developing medical science and render it more valuable and useful. This general plan has received the approval of both the members of the U S P Committee of Revision and Board of Trustees.

#### THE PHARMACOPŒIA WILL ESTABLISH AN OFFICIAL METHOD FOR PREPARING PERCENTAGE SOLUTIONS

The correct method for preparing a percentage solution for medicinal use has long been in dispute. Some authorities have always insisted upon using the 'Weight-weight' (w/w) method as the only correct procedure. Others have argued with equal insistence that the 'Weight-volume' (w/v) method was the only practical plan. The new British Pharmacopœia has led the way to make the practice in drug stores uniform by prescribing an official method as follows:

##### 'Percentage Solutions'

In defining standards the expression 'per cent' is used according to circumstances with one of three different meanings. In order that the meaning to be attached to the expression in each instance may be clear, the following notation, which has long been in use by pharmacists, has been adopted:

*Per cent w/w percentage weight in weight* expresses the number of grammes of active substance in 100 grammes of product.

*Per cent w/v percentage weight in volume*, expresses the number of grammes of active substance in 100 millilitres of product.

*Per cent v/v percentage volume in volume*, expresses the number of millilitres of active substance in 100 millilitres of product.

The strengths of solutions of solids in liquids are expressed as percentage weight in volume of liquids in liquids as percentage volume in volume, and of gases in liquids as percentage weight in weight.

In the dispensing of prescriptions, when the expression 'per cent' is used

without qualification, it is to be interpreted to mean, for solutions of solids in liquids, per cent weight in volume, for solutions of liquids in liquids, per cent volume in volume, for solutions of gases in liquids, per cent weight in weight. Thus, a '10 per cent' or a '1 in 10' solution is prepared by dissolving 10 grammes of a solid, or 10 millilitres of a liquid, in sufficient of the solvent to make 100 millilitres. A solution of the same strength may be prepared on the Imperial System, and on the Apothecaries' System, by dissolving 44 grains (more precisely 43.847 grains) of a solid, or 48 minims of a liquid, in sufficient of the solvent to make 1 fluidounce (480 minims) of solution."

Our own Committee of Revision, after discussion, voted at the recent Conference to introduce a similar paragraph in the new Pharmacopœia

#### THE REVISION OF THE FOOD AND DRUGS ACT IN ITS RELATION TO THE U S P

No one can now predict the final form in which the rewritten Federal Food and Drugs Act may be passed by Congress or when that may occur, but it is of the utmost importance to the work of our Committee and to the future of the United States Pharmacopœia that it should retain essentially the status proposed in the first draft offered to Congress by the Secretary of Agriculture, and introduced into both the Senate and the House.

The added recognition of Pharmacopœia standards, covering as it does the U S P and N F definitions, descriptions, formulas, tests, assays and the packaging and labeling specifications, places greatly increased responsibility upon the decisions of the U S P Revision Committee.

The "variation clause" is retained to meet the legitimate need for modifications in official products, such as the demand for a "Half-Strength or Double Strength Ointment of Mercuric Oxide" "Half-Strength Tincture of Iodine" etc., and to allow the sale of products of technical grade and also to permit the sale of established preparations differing in flavor, color or strength from the official. However, the new requirement will compel a labeling which clearly indicates wherein the unofficial product differs in strength, quality and purity from the specifications of the Pharmacopœia or National Formulary. This has not been a part of the law heretofore.

The feature which authorizes the Secretary to prescribe additional tests or assay methods to determine whether or not the official standards are being complied with, should it be found necessary, is entirely new. This, however, greatly strengthens the position of the Pharmacopœia for no vital objective or responsibility of our Committee is disturbed and the enforcement of the necessary standards, which our Committee have established, is helped. The first duty of the Committee of Revision is to decide the scope of the new Pharmacopœia, that it may represent the therapeutic agents of the day believed to be worthy of recognition. This duty remains exclusively in our hands.

The second responsibility of our Committee is to establish the quality and purity of these medicinal products to insure their being efficient, uniform and safe. This still remains as our exclusive job.

A third important feature of revision is the establishment of tests and assay methods whereby it can be proven that the products offered for sale and used in dispensing when official titles or synonyms are written, meet the standard specified.

All who believe in our Pharmacopœia will desire to maintain these standards and if added tests can help in doing so, we must welcome that assistance. At this point, however, comes in the program of "Interim Revision," as an essential feature, for it is expected that the Revision Committee hereafter will quickly recognize the need for modifying obsolete standards, tests or assays and by making the revised texts official by "Interim Revision" the necessity for any such Secretarial action, except in extreme emergency, will be avoided.

The existence of such authority will also stimulate the Committee of Revision in its work and insure a close cooperation between the Committee and the enforcement officials.

#### EXTENDING PHARMACOPŒIAL INFORMATION

The new booklet, on the Use of Pharmacopœial Substances by prescribing physicians, prepared for distribution at the American Medical Association Convention this year, is also offered to AMERICAN PHARMACEUTICAL ASSOCIATION members at the U S P Exhibit in this Hotel. This booklet, through requests from the Deans, has also been placed in the hands of this year's medical graduates, 4624 in number, and in 54 Colleges of Medicine throughout the United States.



A Pharmacopœial Exhibit has also been placed at the World's Fair in Chicago and we have also again had opportunity to present the Pharmacopœia in the Scientific Section of the American Medical Association Annual Exhibition, the School of Pharmacy of the University of Wisconsin assuming responsibility for it. There have also been numerous inquiries from hospitals for help in the installation of a program for restricting the hospital dispensing to U S P and N F medicinals. In a number of cities and states, active programs are being conducted by National or Local Pharmaceutical Associations, while the Philadelphia County Medical Association has asked for a monthly exhibit of official products, with suitable literature, for their Headquarters Building.

Apparently there has never before been so much interest in U S P products, from professional sources.

When the new Pharmacopœia appears this program should be greatly extended but only along the most ethical and professional lines. It is hoped that the suggestion to issue monthly articles on the therapeutic application of official medicinals, for publication in the medical journals and later reprinting in booklet form, may be carried out. The younger physician, particularly, would welcome specific suggestions for prescription combination or methods of using these standard and established products.

#### THE PHARMACOPŒIAL SECTION OF THE PAN AMERICAN MEDICAL ASSOCIATION

The U S P Committee of Revision was very fortunate in having Professor T J Bradley voluntarily represent the Committee at the meeting held in Dallas, Texas, March 21st to 25th. It may be a surprise to many to learn that there were over one thousand physicians at this meeting. There seems to be an unusual opportunity for Pan-American medical standards to be coordinated through this movement and American Pharmacy should plan to participate in the next meeting to be held in two years.

#### THE INTERNATIONAL STANDARD FOR THE ŒSTRUS PRODUCING HORMONE

While the Pharmacopœia has not yet recognized or admitted a representative of the Œstrus producing hormone now available commercially from a number of pharmaceutical laboratories, the Board of Trustees at its recent meeting, authorized the distribution of the "International Standard" for this product through the office of the Chairman of the Committee of Revision. This action is in harmony with the broadening service which our Pharmacopœial organization is rendering to the medical and pharmaceutical professions in this country, the distribution of the International Standards for Vitamins A, D and B<sub>1</sub> having previously been approved. Already many of the Vitamin Standards have been distributed in this country.

In the published announcements with respect to vitamin standards, the Vitamin Laboratory of the Bureau of Chemistry and Soils of the Department of Agriculture and the Board of Trustees of the U S Pharmacopœia have both been named as distributing centers. In the case of this new International Standard, just issued by the Permanent Commission on Biological Standards of the Health Organization of the League of Nations, through Sir Henry Dale of the National Institute for Medical Research in London, neither the National Institute of Health nor the Food and Drug Administration at Washington has been in a position to undertake its distribution and they have recommended that the Pharmacopœia assume this added service.

These standards have not yet been received from London, but, as soon as they are available, there will be an announcement sent to those who are now carrying out researches in this field and also those who are manufacturing commercial products.

This service of the Health Section of the League of Nations should materially assist in establishing a degree of uniformity in the potency of the products of this character now available since they, no doubt, will be evaluated upon the basis of these new International Units.

#### BROADENING U S P ACTIVITY

This brief review will provide an insight into the rapidly expanding service of the Pharmacopœia and its capacity for meeting new and changing conditions. The Board of Trustees and Committee of Revision have met every situation as it has arisen with energy and efficiency.

The report of the Committee on the N F was called for. It was presented by E N Gathercoal. He stated that he had prepared a mimeographed copy of the report which was presented. Chairman Cook referred to the relationship which existed between these standards.

## THE DEVELOPMENT OF N F VI

BY E. N. GATHERCOAL, CHAIRMAN OF THE NATIONAL FORMULARY COMMITTEE

In this short address there are four ideas culminating in a conclusion that will be presented for your attention:

*First* As you all know the U. S. Pharmacopœia was originally prepared exclusively by physicians and for physicians and it is still maintained that the physician should be the most interested of any group in the U. S. P. The National Formulary originally was intended to be exclusively a pharmacist's handbook, but the pharmacists who have it in charge have been gradually recognizing that the National Formulary must enlist the interest of the physician if it is to prosper and to grow in influence. This means that the National Formulary has in part at least, changed its *objective* and approaches in this respect the U. S. Pharmacopœia. In the progress of the present revision steps have been taken by the N. F. Committee with the thought definitely in mind of making N. F. VI of more interest to the physician.

*Second* An extensive effort has been made to determine which items of medicine are really being used in prescriptions and are being sold in drug stores with the thought in mind of omitting from N. F. VI those items which are not much used and of including those items (non U. S. P.) which are being used as medicines. Furthermore the National Formulary Committee took a definite step at the suggestion of E. Fullerton Cook to admit into N. F. VI those simple drugs and chemicals that are not U. S. P. and that are not used in any preparation in N. F. VI, but that do have a wide use in medicine.

We all know that the U. S. Pharmacopœia has always stood on a firm therapeutic foundation. As the scientific knowledge, regarding the usefulness of drugs has increased it has been combined with clinical knowledge and every item proposed for admission to the U. S. Pharmacopœia has been critically examined in the light of this combined knowledge. The National Formulary hitherto has consistently denied any therapeutic examination to the items given admission to it. However in this revision such examination indirectly at least, is being applied in the fact that we are requiring these items to show prescription usage. Certainly there is no better criterion as to the therapeutic value of a medicine than the extent to which the physicians of our land prescribe it. Here again in the *scope* of the National Formulary we are definitely approaching the same scope as that of the U. S. Pharmacopœia.

*Third* Since the passage of the National Pure Food and Drugs Act in 1906 the U. S. Pharmacopœia has taken on in each revision more and more the character of a legal standard. Every word is critically examined to see that it properly meets the legal conditions. Consultation with the national enforcement officials has been frequent and these officials have watched the course of the revision and have pointed out improvements from their point of view. The present National Formulary Committee has been giving very careful consideration to the legal character of the book and is in close touch with the authorities in Washington who have in charge the enforcement of the pure food and drugs law. In this revision these officials now receive copies of the complete N. F. Bulletin and Sub Committee Letters. Apparently these are read as carefully and critically as the *U. S. P. Circulars* and *Sub Committee Bulletins*. Certainly we are receiving splendid suggestions from these officials in connection with the N. F. Revision and particularly from the enforcement point of view. In its *legal* character therefore N. F. VI will closely approach U. S. P. XI.

*Fourth* It is well known to you that in the construction of the monograph and in the general makeup of the book N. F. V followed very closely U. S. P. X. This is being continued with N. F. VI. It is seriously proposed that in N. F. VI we do away with 'Parts I, II and III' and follow the U. S. P. in a strictly alphabetical arrangement of all monographs. If this be done N. F. VI will even more closely resemble U. S. P. XI in *style of monograph and book*.

## CONCLUSION

What then are we doing? Why is the National Formulary becoming more and more like the U. S. Pharmacopœia? What is the object in making the two books so much alike in objective in scope, in legal character in the type of monograph and in general makeup? There has been no predetermined effort to do this. We find that every time a question bearing on this point is decided by the Committee the decision brings the two books closer together. However all of

these movements seem to be for the best interests of the N F. The aim constantly in view is to make the book more useful and more popular to both physician and pharmacist. The interests of pharmacists are being maintained and improved rather than being depreciated or lost and the interests of physicians are being increased. The new book will be of great practical value to the pharmacist, and certainly physicians should be interested in standards for all of the items they prescribe.

There remains one final thought. Shall we quietly and simply place the National Formulary in the position of a secondary pharmacopœia and be content therewith? Shall we endeavor to establish a definite and self-evident distinction between the two books and maintain the impression that they are very distinct entities not related to each other? Such a distinction has been suggested of late, in that the U S Pharmacopœia should become a book standardizing only chemicals and vegetables or animal drugs while the National Formulary should have no simples, but should standardize only preparations of these simples. Prof E Fullerton Cook has very ably answered these questions in a communication addressed to the National Formulary Committee and printed in the N F Bulletin. He says in part: "When Dr Charles Rice actively promoted the National Formulary he was Chairman of the 1880 Committee of Revision of the United States Pharmacopœia and it was definitely planned and established as a supplementary book to the Pharmacopœia. In fact, this was the only excuse for its existence. The National Formulary has always frankly taken the place of a secondary book and it has not been particularly discredited because of this, as it occupies a very important position and has legal authority equal to the Pharmacopœia. The definite policy at the present time for including in the Pharmacopœia only those items which are therapeutically acceptable to the physicians elected by the United States Pharmacopœial Convention and to include in the National Formulary other items extensively used by physicians but not found in the U S P, is sound and generally acceptable."

The two books should continue along the same lines that they are now following, for there are splendid fields for each of them. The U S Pharmacopœia should be the highest therapeutic authority in the land. It should not only present the best remedy out of a group of remedies but it should present a suitable remedy, where possible, for every pathogenic condition where a medicine is needed. So far as possible, the National Formulary should provide standards for all non U S P remedies used by physicians.

There is a great difference in medical practice between a list of remedies of highest therapeutic standing and a list of remedies widely used by physicians. This statement casts no reflection upon the ability of the medical profession. It is characteristic of the human race that some lead and others follow. Certainly this is true in the medical profession where also differences of opinion constantly exist regarding the therapeutic value of medicines. Neither is there any unfavorable reflection cast upon the National Formulary by this statement. The U S Pharmacopœia is much the older book and throughout its existence has been without a rival as the leader of therapeutic thought in this country. All of the violins in an orchestra cannot be *first* violins. It is certainly very much more honorable and may indicate a very much higher standing in musical ability to be second violin in a high class orchestra than a *first* violin in a third or fourth rate orchestra.

#### PHARMACEUTICAL RECIPE BOOK

The report on the Recipe Book was presented by Chairman J. Leon Lascoff as part of the Symposium on Practicing Professional Pharmacy" (See page 1196)

The report of the Committee on Non Official Standards was presented by Chairman John C. Krantz, Jr.

#### REPORT OF THE COMMITTEE ON UNOFFICIAL STANDARDS

BY JOHN C. KRANTZ, JR. CHAIRMAN

##### ORGANIZATION

Since the presentation of the 1932 report the personnel of the Committee on Unofficial Standards of this Association has remained practically unchanged. The Committee is divided into two sections: a chemical section under the chairmanship of Dr. Hugo H. Schaefer and a

botanical section under the chairmanship of Professor E B Fischer In addition to the regular members of the Committee there are serving in the capacity of consultants several associate members

#### PROGRESS OF WORK

Last year Doctor Rose submitted a tentative monograph for a preparation containing the glucosides of digitalis suitable for injection During this year the committee has extensively studied this preparation in collaboration with Dr James C Munch, and we feel that a more or less stable and dependable digitalis preparation has been devised At the Pocono meeting of the Revision Committee of the United States Pharmacopœia, Doctor Scoville spoke of the desirability of including a preparation of this type in the forthcoming revision of the Pharmacopœia The Committee on Unofficial Standards submitted its work to Doctor Scoville to be studied further for the purpose of including the monograph in the Pharmacopœia

#### PLANS FOR FUTURE WORK

The Committee in planning its future work invites the suggestions from ASSOCIATION members interested in the establishment of standards It is their purpose during the coming year to project our preparation of monographs and standards to some of the new and more generally used unofficial drugs

E N Gathercoal referred to the importance of the work of this Committee He thought that he had an opportunity to question standards for items no longer official or that never have been official He thought Dr Krantz had a wonderful future in the work of his Committee to prepare a number of monographs

Chairman Marvin J Andrews took the chair

He called on Dr H V Army to give a report as chairman of the Committee on Glass Standardization

#### GLASS STANDARDIZATION

Chairman Army asked permission to use his allotted time for (a) the report of the Committee on Glass Standardization, (b) the report of the Committee on Research

As to *Glass Standardization*, in 1932 the committee reported that it had secured \$2000 for another two year research on the study of the deterioration of chemicals exposed to light in suitable glass containers This work is being successfully carried on by R H Blythe, B S, under the personal supervision of Professors Army and A Taub at the College of Pharmacy of Columbia University The 1932-1934 research is being carried on, some 30 chemicals being studied along the same lines followed in the Army-Taub Steinberg research of 1929-1931 The present work is incomplete but the findings to date were published in the July number of the *Glass Container* Any person interested may obtain a reprint of this paper by applying to Dr Army

As to the *Committee on Research*, attention must be paid to the important experiment begun in 1932 Upon the recommendation of the Committee, with the approval of the Council and with final confirmation by the ASSOCIATION, we established a specific research upon the problem of extraction We formed a sub-committee of five to supervise the research and we then selected Dr W J Husa of the University of Florida to conduct the work, a grant of \$1000 from the A Ph A Research Fund being voted for the financing of the proposition Dr Husa and his associates have performed unusually fine work during the past scholastic year The work is as yet incomplete, but the results so far obtained are so important, that the Research Committee feels that the work should be continued during the coming year and upon unanimous vote of the Committee and by a mail vote of the Council last July, a second grant of \$1000 was awarded to Dr Husa and his associates for a continuance of the extraction work during the scholastic year 1933-1934

Dr Army then asked permission to accord the rest of his time to Dr Husa, who then outlined his work of 1932-1933

W J Husa made the report on the A Ph A Drug Extraction Fellowship It follows

## REPORT ON A PH A DRUG EXTRACTION FELLOWSHIP

BY WM J HUSA

A year ago, on recommendation of the A Ph A Committee on Research, a \$1000 research grant was awarded by the A Ph A for research on drug extraction to be carried out under the direction of Dr W J Husa, at the University of Florida. Mr Louis Magid, B S in Pharmacy, M S in Pharmacy, a former winner of the Fairchild Scholarship, was appointed A Ph A Fellow on Drug Extraction. Mr Paul Fehder and Mr C L Huyek, both graduate students at the University of Florida, have also conducted research on certain phases of the general problem. The work of these three men has been under the direct supervision of Dr W J Husa, who has been assisted by a special supervisory committee of ten of which he is chairman, representing the fields of pharmacy, pharmacognosy, pharmacology, chemistry, physics, plant physiology, plant chemistry and biochemistry, made up of faculty members of the University of Florida and research workers of the Florida Agricultural Experiment Station. The entire project has been under the general supervision of a sub-committee of five members of the A Ph A Committee on Research, consisting of Dr H V Arny, *Chairman*, Dr W L Scoville, Dr George D Beal, Dr E N Gathercoal and Dr C Fullerton Cook.

The main purpose of the first year's work was to investigate the fundamental principles involved in drug extraction, it being recognized that much of our knowledge in this field is purely empirical. Studies have thus been made of the swelling of woody tissues in alcohol, water, glycerin and their binary and ternary mixtures in some of the newer organic solvents. For this study methods were devised for the convenient determination of the swelling of thin strips and blocks of woody tissue, as well as for powdered drugs. Studies were made of the rate of penetration of various solvent mixtures into woody tissue. The theoretical aspects of the effect of solvents on drugs were considered from several points of view, such as solvation, evolution of heat during maceration, effect of the structure of the drug, effect of solubility of the constituents, etc. The methods evolved were applied in studies of swelling and penetration using belladonna root and jalap. Studies are in progress on the rate of penetration by solvents and rate of extraction of constituents in a maceration process.

The grant having been renewed for the coming year, work has been planned involving a comprehensive study of the extraction of two drugs of different types, *i e*, belladonna root and jalap. The methods and principles developed in the past year's work will be applied as far as possible in the intensive study of extraction with the purpose of developing general principles and techniques which will be helpful in studying the extraction of other drugs. While it may be true that each drug presents an individual problem, it is believed that a study of fundamental principles and the development of new techniques for drug extraction research will lead to a better understanding of drug extraction and stimulate further scientific studies in other laboratories on the extraction of other drugs as well as on the scientific principles involved.

Detailed monthly reports have been submitted to the sub-committee of five, including extensive tables of data, graphs, photomicrographs, etc. Plans are under consideration looking toward a start on publication of the results within a few months in a series of papers in the *JOURNAL OF THE A Ph A*.

The report of the Committee on the Ebert Prize was presented by Chairman Heber W Youngken.

## REPORT OF THE COMMITTEE ON EBERT PRIZE

Your committee has examined all of the published and unpublished papers presented to the AMERICAN PHARMACEUTICAL ASSOCIATION at the Toronto meeting in 1932. After careful consideration of the merits of each, it has decided to recommend that the Ebert Prize be awarded to Edwin Gilis and H A Langenhan for their splendid treatise entitled "A Phytochemical Study of *Hydrastis Canadensis*".

Aug 31 1933

(Signed) { E E SWANSON,  
L E WARREN,  
HEBER W YOUNGKEN, *Chairman*

The report was accepted

This completed the order of business for this Section

The following paper, "Some Facts Concerning the Pharmacological and Physiological Action of Acetanilid" by S. T. Helms, was presented (No discussion)

The following papers were presented by James C. Munch

"The Effects of Thallium on Vegetative Growth," by James C. Munch, F. R. Garlough, J. C. Ward and E. E. Horn "The Nephrotoxic Action of Thallium Compounds" by H. J. Spencer, James C. Munch, J. C. Ward and F. E. Garlough "The Effect of Altitude on the Action of Drugs, I. Strychnine" by J. C. Ward and A. W. Moore

The Joint Session was then adjourned

### THIRD SESSION

The Third Session of the Scientific Section convened at 2:00 P. M. on Friday, September 1st. Chairman Husa presiding.

The first paper, "The Toxicology of Barbituric Acid Compounds," by Amelia M. de Ponce and James C. Munch was presented. The paper on "Picrotoxin Barbituric Acid Antagonism" by Amelia M. de Ponce and James C. Munch was presented at the same time by James C. Munch (No discussion)

President Philip congratulated the Scientific Section for its work during the year.

The following papers were presented: "Common Seeds and Their Dispersal" by L. K. Darbaker (No discussion) "The Fate of Mannitol in the Animal Body," by C. Jelleff Carr, Jacob E. Schmidt, Ruth Musser and John C. Krantz, Jr. It was read by Mr. Carr (No discussion)

The following papers were presented by James C. Munch: "The Bioassay of Picrotoxin and Cocculus Indicus Preparations" by James C. Munch "A New Factor in Pituitary Assays" by Amelia M. de Ponce and James C. Munch (Discussion will be submitted when papers are printed)

A paper on "Synthetic Phytosterols" by Ole Givold and Edward Kremers was presented by Mr. Givold (No discussion)

The next paper on "The Action of Ergot and Its Alkaloids on the Puerperal Uterus," by E. H. Stuart and E. E. Swanson was presented by E. E. Swanson (Discussion will be submitted when paper is published)

An Unusual Peppermint Oil ' by Sister M. Francis Xavier and Edward Kremers was not read because of the absence of the authors.

The succeeding papers were: "Several Organic Arsenicals" by George Doak and Edward Kremers (No discussion) "Oxidation and Antioxidants" by A. Lee Caldwell and Francis E. Bibbins (No discussion)

On account of the absence of the authors the following papers were not read: "The Preparation and Bacteriological Study of Certain Thioazole Azo Dyes" by W. A. Lott and W. G. Christiansen "Di-beta-Bromallyl Amino Ethyl para Amino Benzoate" by W. Brake and W. G. Christiansen "A Convenient Laboratory Method for the Preparation of Unsymmetrical Diethyl Ethylene Diamine" by W. A. Lott and W. G. Christiansen "A Study of a New Series of Urethanes" by W. A. Lott and W. G. Christiansen "The Preparation and Properties of 3,3'-Bis (Azometa Phenylene diamine) 4,4'-Dihydroxyarsenobenzene and 3,3'-Bis (Azo 2,6 Diamino pyridine) 4,4'-Dihydroxyarsenobenzene" by A. E. Jurist and W. G. Christiansen

C. Jelleff Carr read the paper on "The Influence of an Insulin Free Pancreatic Extract on the Metabolism of the White Rat" by C. Jelleff Carr, James C. Munch, Jacob E. Schmidt and John C. Krantz, Jr. (No discussion)

There was no discussion on the following paper: "Further Studies in Strychnine Quinine Alkaloids, Antagonisms and Potentiations" by James C. Munch and Harry J. Pratt

"Absorption of Vitamin D from the Skin" by Florin J. Amrhein was read by the author

Owing to the absence of the authors the following papers were not read: "The Germicidal Action of 2-Chloro-4-n-Alkylphenols" by F. F. Blicke and R. P. G. Stockhaus "The Pharmacological Action of Ten Amines Related to Ephedrine and Tryptamine" K. K. Chen and A. Ling Chen

The following papers were read by James C. Munch: "Quantitative Applications of the Modified Turck Test" by James C. Munch, Harry J. Pratt and Amelia M. de Ponce (No discussion) "Organoleptic Bioassays" James C. Munch, George E. Byers and Harry J. Pratt (No discussion) "The Mydriatic Activity of Lactucaria by the Munch Method" by James C.

Munch, Harry J Pratt and George E Byers (No discussion) It is printed in the October JOURNAL, pages 943-947

The two following papers were read by title "The Volatile Oil of Hyptis Mutabilis," by Harold W Werner, and "The Potency of Native Digitals of Oregon," by Ernst T Stuhr and Donald Kuo Chih Lee

James C Munch presented a paper on "A Critical Study of the Broom Clark Method for the Bioassay of Ergot Preparations" by Anelia M de Ponce and James C Munch (No discussion)

The report of the Committee on the Chairman's Address was then taken up Chairman John C Krantz, Jr, read the report

#### REPORT OF THE COMMITTEE ON THE CHAIRMAN'S ADDRESS

1 The Committee wishes to commend the Chairman on his critical study of the activities of the Section so well set forth in his address

2 The Committee approves the Chairman's recommendation to limit the reports before the Joint Session of the sections on Practical Pharmacy and Dispensing and the Scientific Section to UNITED STATES PHARMACOPOEIA report, 20 minutes, National Formulary report 20 minutes other reports are limited to 10 minutes with a maximum period of 5 minutes discussion for each

3 The Committee approves recommendation No 2, empowering the officers of the Section to organize two or more divisions of the Section to hold simultaneous meetings for the presentation and adequate discussion of papers

4 Approves Recommendation No 3 namely, that the Council of the Association consider the advisability of securing funds for the purpose of supporting an adequate publication program

5 Approves Recommendation No 4, in part namely that space now devoted to the monthly printing of the roster of various organizations be made available for the publication of scientific papers

6 Approves that the number of papers offered by any laboratory be not curtailed—the Committee on the other hand regrets that other laboratories do not publish more of their work through this medium

(Signed) { GEORGE D BEAL  
G L WEBSTER,  
JOHN C KRANTZ JR

Chairman Krantz moved the adoption of the report F E Bibbins inquired whether the division of the Section into sections for simultaneous meeting is a positive order or a suggestion

The Chairman stated the officers were empowered with a prerogative

George L Webster believed the recommendation (not quoted) that the officers be empowered to ask the Council of the Association for the privilege of doing so if the emergency warranted

Mr Bibbins said that was the point he desired to bring out

E V Lynn inquired whether there was a place for discussing the number of papers that are presented Chairman Husa said this could be brought up under New Business

Chairman Krantz asked consideration of the part of the report relating to reports of the Joint Session of the Scientific Section and Section on Practical Pharmacy and Dispensing On motion of F E Bibbins seconded by James Munch vote was called for and carried

Chairman Krantz asked for consideration of Recommendation No 2

Mr Webster stated that the vote should be to empower the officers to ask the Council for consent to hold simultaneous meetings Move to adopt was made by James C Munch and E V Lynn—carried

Chairman Krantz asked for consideration of Recommendation No 3 that the Council of the Association consider the advisability of securing funds for the purpose of supporting an adequate publication program In due order this was adopted

Chairman Krantz brought up Recommendation No 4 re the roster pages to be made available for papers of the Scientific Section

F E Bibbins referred to a session of Council when the value of the roster was discussed that to reduce the publication of it would detract from its value

E V Lynn inquired whether there was any objection to recommending the Recommendation

James C Munch stated he had discussed the subject with Editor Eberle, who said that the roster was referred to frequently by members and in correspondence

Chairman Husa referred to the number of pages in the roster during the year He was of the opinion that parts of the roster might be alternated He had relinquished the chair to the Vice-President so as to discuss the proposal After some further discussion the acceptance was put to a vote and carried

Chairman Krantz asked for consideration of Recommendation No 5—that the number of papers offered by any laboratory be not curtailed, the Committee regrets that other laboratories do not publish their work through the JOURNAL

E V Lynn thought the papers should be curtailed He was advised that about 25 papers were left over from last year and at this session there were many papers presented He was of the opinion that a somewhat similar method was adopted by the American Chemical Society Papers presented here should be referred to a Committee for study and censoring them In many cases papers can be cut down materially and perhaps some papers should not be published

James C Munch said he had about twenty-one papers and that he had completed six other pieces of investigation, which are partly written up for presentation He said, a few years ago the Scientific Section had to beg for papers for the program The opinion of some members has been that one year there is a very large number of papers and in another year the reverse is the case

He thought that it could be arranged by asking a contributor of a number of papers to designate the more important and this would give him longer time on the other papers

He had six investigators with Sharp & Dohme, twenty with the Federal Government and about fifteen at Temple University This material should be published in the JOURNAL A PH A The fact that a paper is not published in this publication does not mean it will not be published elsewhere His experience with Editor Eberle has been that he unhesitatingly tells him when a paper might better be published in another journal In other words, the ASSOCIATION owns the papers presented here but is perfectly willing to waive publication of them if the authors or the editor feels that they should be published in some other journal He was convinced that most of the papers presented in this Section have a direct relation to pharmacy He did not believe that the time is ripe for deliberately curtailing the number of papers

F E Bibbins inquired whether this was not the work of the Committee on Review of Papers—they are supposed to work with the Editor and review all the papers of the Section before publication

Chairman Husa thought the discussion was hearing a little away from the motion, which is, that the number of papers from one laboratory should not be curtailed

Dean Rivard thought that some of the papers could be printed in abstract or complete as a monograph

After some further discussion Recommendation 6 was adopted by vote

Chairman Krantz stated that this completed the business of the Committee on the Chairman's address He moved the following resolution

That all papers presented before the Scientific Section be presented to the Committee on Review of Papers for approval before being accepted for publication in the JOURNAL The decision of the Committee on Review of Papers shall be final, and it shall be forwarded to the Editor for communication to the author "

F E Bibbins moved adoption of the resolution

E V Lynn asked for the meaning of the resolution

John C Krantz, Jr, explained that papers presented here, before being accepted for publication, shall be given to the Committee on Review of Papers who will pass on the advisability of publishing them He thought that in some instances it would have to call on expert advice in various fields before reaching a final decision It might be advised that papers be materially condensed, sometimes tabular matter could be omitted from the paper, it might be advisable not publishing at all The report will be forwarded to the Editor and, in turn, he shall report to the author

After some further discussion by Messrs Krantz Bibbins and Lynn, the latter moved the



insertion of the word, "must," i. e., that "the papers must be referred to the Committee on Review of Papers before publication in the JOURNAL."

F O Taylor inquired whether the Editorial Board mentioned in the discussion is the same as the Committee on Review of Papers. He was advised that it is the same Board, not a new Board.

Heber W Youngken asked relative to the function of the Committee on Review of Papers, whether it could indicate the title for a paper and have the right to delete certain portions of a paper.

Chairman Husa said the name should be Committee on Review of Papers. It is required that all papers of the Scientific Section be presented to the Committee for review, before publication in the JOURNAL.

John C Krantz said the Committee would have the right to recommend changes to the Editor. Heber W Youngken did not approve of such changes as he had inquired about, he saw great danger ahead. Dr Krantz explained that the paper would under such circumstances be returned to the author for revision.

F O Taylor thought the point taken by the latter had worked very well in the American Chemical Society. In his opinion more work will be added to that of the Committee. The principle of the thing he believed to be good. Exactly how those details should be worked out would have to be left to the good judgment of the Board.

Secretary Rowe explained that heretofore there had been no condensation of papers (except as brought about by the Editor).

Mrs W Bruce Philip referred to a paper which she had presented to the Editor, but he replied that he could not pass on it—he would refer it to the Committee on Review of Papers. There was some discussion as to whether the Committee should be elected or appointed by the Chairman of the Section.

James C Munch thought the appointment should be made by the Chairman. He also referred to several very long papers which had been submitted to the Section in the past.

F O Taylor agreed with the former as to appointment.

The resolution was again read by Chairman Husa, he asked Dr Krantz relative to the name of the body, he replied that it is "The Committee on Review of Papers." The resolutions read as follows:

"Resolved, That all papers presented to the Scientific Section must be referred to the Board of Review of Papers of the Scientific Section for approval before being accepted for publication in the JOURNAL."

The decision of the Board of Review of Papers shall be final. It shall be forwarded to the Editor for communication to the Author.

A motion to adopt was seconded and carried by vote.

John C Krantz moved that all papers to be published under the Scientific Section in the JOURNAL must be referred to the Board of Review of Papers of the Section. Seconded by James C Munch, and carried by vote.

C Jelleff Carr referred to the *Journal of Biological Chemistry*, in which the inside of the cover page is devoted to the type of Journal reference and various information of the authors. He suggested a small committee to study possibilities along this line. James C Munch made a motion that these suggestions be referred to the Committee on Review of Papers for rejection or approval at the next meeting. It was carried by vote.

He moved that the reports of the members of the Committee on Monographs be presented as part of the minutes of the Joint Session of the Scientific Section and the Section on Practical Pharmacy and Dispensing, when these monographs are completed. The motion was seconded by John C Krantz, Jr., and after some discussion was carried by vote.

The two following papers were read by James C Munch, "A Critical Study of the Broom-Clark Method for the Bioassay of Ergot Preparations," by Amelia M Ponce and James C Munch. "Antidotes. I. General Plan," by F E Garlough and James C Munch.

"The Application of Statistical Methods to Pharmaceutical Research. IV. Methods of Recording Drug Action" by James C Munch and F E Garlough.

George O Doak inquired relative to the chemical poison in Red Squill. The author replied that it was not an alkaloid and he was not certain whether it was a glucoside. Little is known.

about the solubility of the active constituent, and considerable relative to the pharmacological action. The workers had been able to obtain a product that resembles a glucoside more closely than any other group.

F. F. Berg presented the report of the Committee on Nominations.

On motion of James C. Munch and seconded by G. L. Webster the Secretary was instructed to cast a unanimous ballot of the Section for the officers named in the report. The Secretary was so instructed and the following were declared elected officers of the Section:

*Chairman* F. E. Bibbins *First Vice Chairman* E. V. Lynn, *Second Vice Chairman* H. M. Burlage, *Delegate to the House of Delegates*, Wm. J. Husa. The officers were presented and duly installed.

Chairman Bibbins thanked the members of the Section for the honor conferred and he asked for cooperation of the members. The other officers of the Section briefly expressed their appreciation for the honor conferred.

Chairman Husa asked whether there was any new business.

James C. Munch stated that at the time the Committee on Monographs was appointed the thought was that the reports could be presented by the respective authors before the Joint Session of the Scientific Section and the Section on Practical Pharmacy and Dispensing. He thought it was probable that the first monograph on Aconite will be completed before the next annual meeting. In his opinion provision should be made on the program and each of the authors of each monograph should be given five or ten minutes to state what had been done so that the Association might have an idea of the work accomplished. These monographs will have to be published and sold at a price to defray the expenses.

Chairman Husa relinquished the chair. He wondered whether the action would be premature.

Dr. Munch stated that if arrangements were made to provide place on the program it would arouse interest. It was not expected that the A. Ph. A. would finance the cost of the publication. Such arrangements will probably be made outside of the Association and orders solicited for copies of the monographs and this discussion will enable the Publication Committee to form an idea as to the approximate demand for copies of the monographs.

The Final Session of the Scientific Section was then adjourned.

## SECTION ON PRACTICAL PHARMACY AND DISPENSING

The First Session of the Section on Practical Pharmacy and Dispensing was called to order by Vice Chairman Marvin J. Andrews because of the absence of Chairman W. Paul Briggs (Thursday, August 31st, at 9:00 A. M. (Chairman Briggs could not attend because of the serious illness of his mother).)

The Secretary's report follows:

### REPORT OF THE SECRETARY

The Secretary's report writes itself rather well in the program of the Section, therefore, an extended resume is not needed at this time. The work has been interesting and while at times it may have seemed somewhat discouraging yet slowly but surely it was accomplished and the program completed.

Two items which the Secretary hopes will become a part of future procedure. *First* that all members contributing papers will forward to the Secretary by July 1st, the title and a short abstract. If this is done the preparation of the official program is greatly facilitated. *Secondly* the establishment of a Registry Book to be signed by all persons interested in the work of the Section with their addresses. This offers a means of building up a membership in the Section and developing an interest in the advancement of our part in pharmacy.

Thanking the members for their help in building the program for these sessions the Secretary voices the views of the officers in saying that they have been very happy to serve.

R. E. TERRY *Secretary*

On motion duly seconded report was received and accepted as read.

The Chairman appointed as members of the Committee on Nominations L W Rising C V Netz and H M Burlage

The reading of the papers was proceeded with as follows

Variations in Hand Moulded Hypodermic Tablets," S W Bower (No discussion)

Amaranth as a Substitute for Cudbear," by Sherman W Morrison.

Dr Bernard Fantus expressed his appreciation of the work. He stated that the colors of medicine had a psychological effect on the patient and it should be possible to provide standards for colors, that crude drugs should be abandoned in favor of more definite compounds

Wm Gray suggested that the selection of the coloring be considered in providing a standard. The author showed samples of the alkaline and acid solutions of amaranth and cudbear and noted the differences in the colorings

The Preservation of Halibut Liver Oil with Hydroquinone," by W S Jones and W G Christiansen was read by F W Nitardy. H M Burlage inquired whether two different portions of halibut oil might not react differently. Mr Nitardy stated that the unrefined oil is more stable, that some of the natural protective properties are removed in refinement, and it was important to have a method of protecting the refined oil

F W Nitardy summarized the following papers: A Phenyl Derivative of Dulcin as a Saccharin Substitute" by T B Grave, J Lee and W G Christiansen; 'A Comparison of the Effect of Phenyl Ethanolamine and Ephedrine on Nasal Membranes' T B Grave and W G Christiansen; 'The Germicidal Value of Some Unsymmetrical Dialkyl Resorcinols," by S E Harris and W G Christiansen; Local Anesthetics—Phenyl Procaine," by W Braker and W G Christiansen

Wm J Husa presented the paper, The Accuracy of Medicine Droppers with Flared Tips" by Wm J Husa and Lydia M Husa. (The paper is printed in the October issue, page 975) In commenting, F W Nitardy said that tincture of digitalis is commonly prescribed in drops. Such dosage should be designated in minims. Wm Gray stated that some doctors recognize these differences and prescribe a pipette accordingly

Irwin A Becker inquired if the angle of the dropper had been taken into consideration. Dr Husa replied that the experiment only considered drops from the straight position and that the angle might influence the results. It is necessary to understand the doctor's intention in such prescriptions. The hope was expressed that the authors would continue the studies

The following paper was presented

'The Protection of Prescription Labels with Lacquer" by Wm J Husa and Lydia M Husa

William H Glover inquired relative to the author's experience with preparations containing camphor and oil. William Gray recommended the use of flexible collodion as well as lacquer. I A Becker thought that two coats of collodion and two coats of lacquer would prove of value. F W Nitardy suggested a solution of acacia. He preferred a bottle with a lip that would prevent dropping on the side of the label. W J Husa stated that U S P collodion had been used for coating labels. He referred to a variety of lacquers. He also spoke of a case of poisoning because of unreadable labels. Charles H Gauger said that when a bottle is returned for refilling the label coating should be removed so as to make certain of the correctness of the number. Dr Husa stated that his experience was that different firms handle prescriptions differently. Some are very careful and others are not

I A Becker spoke further on the application of the coating

The paper on Sulphurated Lime Solution" by R A Cain and H A Langenhan was presented. (Further work on this solution is being carried on)

H C Newton inquired whether the process produced a more stable product

Mr Cain stated that the method results in some crystallization. Wm Gray commented that the solution can be kept almost indefinitely in well stoppered bottles

Charles H Gauger referred to a prescription of a dermatologist requesting that 10 drachms of the solution be evaporated to 6

S W Morrison said that making the solution accord with the National Formulary and then washing the crystals with hot water resulted in their solution

The following three papers were presented by title

Dental Drugs Accepted and Rejected" by George C Schicks

"Useful Dental Prescriptions" by A. O. Michelsen

"It Can Be Done," by J. Leon Lascoff (Printed in the October number of the JOURNAL, page 970)

Miscible Fluidextract of Ipecac," by W. G. Crockett and J. A. Reese (It is printed in the October JOURNAL, page 968)

Determination of the Reasonable or Permissible Margin of Error in Dispensing Ointments," by Marvin J. Andrews. Discussions will be included with the printed paper.

The First Session of the Section on Practical Pharmacy and Dispensing was then adjourned.

## SECOND SESSION

The Second Session of the Section on Practical Pharmacy and Dispensing was convened by Vice-Chairman Marvin J. Andrews, Friday, September 1, at 2:00 P. M.

The first paper was "Prescription Accuracy as Shown by State Board of Pharmacy Examinations," by R. L. Swain. The author stated that he had worked with Mr. Andrews and some of the findings were included in the latter's paper on "Determination of the Reasonable or Permissible Margin of Error in Dispensing," published in the JOURNAL for August and September 1933.

Emerson D. Stanley inquired whether there might not have been greater accuracy for the prescription if it had contained more potent ingredients. The author stated there are unlimited and infinite possibilities for deviations. He hoped that greater accuracy obtained in prescriptions containing more potent drugs. The author stated that extensive study was being made, and referred to a Maine case where the compounding had been carelessly done. In this case the court reviewed various methods of weighing and dividing powders. Charles H. Gauger stated that in their laboratories at the school they found an average error of about 10 per cent.

D. F. Jones inquired whether the error in many cases might not have been attributable to titration.

The author expressed great interest in the work of Mr. Andrews whereby it was hoped to establish a tolerance limit.

L. W. Rising inquired whether any check had been made on therapeutical differences arising out of deviations. Mr. Andrews thought that the deviations in that respect were not large.

The following papers were presented by title:

'Comparison of Karaya Gum and Tragacanth,' by L. F. Gabel.

'Aromatic Elixir,' by L. D. Havenhill and M. G. Smolt.

'Magnesium Salt of Tribrom Ethyl Sulphuric Acid,' by E. Moness and W. G. Christiansen.

"A Comparison of Neosarsphenamine and Sulfarsphenamine When They Are Dialyzed," by A. E. Jurist and W. G. Christiansen.

"The Solubility of Potassium Chloride in Aqueous Potassium Iodide Solutions" by S. E. Harris and W. G. Christiansen.

'Study of Germicidal and Antiseptic Activities of Some Derivatives of 8-Hydroxy Quinoline,' by E. Moness and W. G. Christiansen.

'Study of Germicidal and Antiseptic Activity of Some Mercury Compound' by E. Moness, S. E. Harris and W. G. Christiansen.

"A Preliminary Study of Capsule Tolerances," by Wm. F. Reindollar.

F. W. Nitardy presented a paper on 'Method and Apparatus for Producing Activated Petroleum Products (radolatum),' a petroleum product activated by ultraviolet irradiation.

R. E. Terry inquired relative to the length of time the material retains its activity. The author replied that the material was about a year old and had retained its activity. The limit of time had not been determined. He stated that more hospitals were trying to make this product. Working in cooperation with Dr. Eising, he found that the U. S. P. petrolatum cannot be used. He also described the construction of the lamp and other parts of the apparatus.

The author referred to cases in which the preparation had been used for wounds that had resisted healing and responded to application of this preparation.

President Philip entered the room and expressed appreciation of the work of the Section.

Reading of papers was continued. The Relationships of Prescription Incompatibilities of Pharmacy" by Leon W. Richards.

R E Terry commented on the study of incompatibles Rowland Jones stated that there was little difficulty in interesting the physician in bringing about the correction of an incompatibility

Dr Fantus said that the doctor should be approached diplomatically

"Hydrogen Ion Concentration of Certain Galenicals," by C Jelleff Carr and John C Krantz, Jr, was read and discussed (Discussion will be printed when paper is published)

There was no discussion of the following papers

A Study of Aromatic Elixir," by C O Lee and Marshall Close

A Study of the Antiseptic Properties of Phenol Ointments," by R O Craw and C O Lee

"A Study of Ointment of Belladonna," by C O Lee and H C Hoch

"A Study of the Precipitate of Fluidextract of Uva-Ursi," by C O Lee and J E Bell

The following papers were presented by title, 'A New Method for Debittering Cascara Sagrada Extracts," by August J Pacini

"Absorption of Acids by Charcoal," by Saul Caspe

"A Practical Enteric Coating for the Retail Pharmacist," by F S Bukey and Phyllis Rhodes

"Aromatic Elixir," by L D Havenhill and M G Smolt

R L Jones inquired relative to the use of formaldehyde as an enteric coating for capsules

Marvin J Andrews referred to a number of papers presented at various sessions of this Section Wm Gray stated that the treatment of gelatin capsules with formaldehyde makes them hard An informal discussion on collapsible capsules followed

R E Terry suggested that the incoming officers study the practicability of forming a committee of the Section on Prescription Tolerances

The report of the Committee on Nominations was presented nominating M J Andrews, Chairman, R W Clark, Vice Chairman R E Terry, Secretary, and L W Rising, Delegate to the House of Delegates There being no other nominations the nominees were duly elected and installed

The officers expressed their appreciation of the honor conferred The Section was then adjourned

For Joint Meeting of Scientific Section and the Section on Practical Pharmacy see under preceding minutes—that of Scientific Section For brief report of the Section to the House of Delegates—see page 1056, October Journal

---

## SECTION ON COMMERCIAL INTERESTS

### FIRST SESSION

The First Session of the Section on Commercial Interests was convened on Wednesday August 30th, at 2 30 P M The meeting was called to order by Vice Chairman John A J Funk, in the absence of Chairman Leon Monell A communication from the Chairman was read by Secretary Henry Brown explaining that, because Mr Monell was in attendance at a conference in Washington on the Retail Drug Trade Code, he would be unable to attend the session His greetings and regrets were extended

Secretary Henry Brown reported on a meeting of the Section on Commercial Interests, following the close of the sessions in Toronto A meeting was also held in Boston to talk over the program for 1933 A third meeting was held in Scranton on April 13th, at this meeting it was urged that there be a diversification in the program of papers and the Secretary was instructed to notify contributors of papers to send them in promptly

On motion of O E Russell, seconded by F W Meissner, the report of the Secretary was accepted as read

The Chairman *pro tem* appointed the following Committee on Nominations C Leonard O'Connell, Florin J Amrhein and Rowland Jones

A paper, "The Prescription Defined," was read by Dr Anton Hogstad, Jr, defining the prescription as a set of instructions from the physician to the pharmacist, belonging in no way to the patient As such, the prescription is a confidential document and examination by detail

men or by other physicians should not be permitted. The use of a drawer or secret file should supplant the spindle commonly used. Common carelessness of physicians due to ignorance of pharmaceutical Latin and inadequate training offered by medical schools, should be tactfully remedied by the suggested use of the telephone where the pharmacist is permitted to ask questions and to double check the physician.

The dispensing of information to physicians on other prescriptions is especially a violation of the confidential relationship defined. Such information is available to the physician either through consultation of the physician writing the prescription or a copy which the patient may obtain.

The use of the prescription blank as an advertising pad which the physician utilizes as a scratch pad is another practice to be discouraged by the incorporation of dignity in this division of the profession.

The assignment of a definite appointed hour to the detail men will also add order and prevent the spending of unnecessary time in the store.

A lengthy discussion followed the presentation of this paper. Rowland Jones supported Mr Hogstad's suggestion on the use of the prescription blank. He has found that the blank without the pharmacist's name is decidedly successful. He does not carry them to the physician's office but provides and recommends a prescription blank for each physician with the name in the lower part. The name of the patient in the upper right hand corner may be offset by the name of the druggist inconspicuously placed. Privacy in the use of the blanks was also recommended.

F W Meissner commented that the perusal of the prescription file by the physician brings about a lack of confidence in the pharmacist on the part of the physician.

Mr Hogstad suggested the appointment of a committee to offer a series of educational measures for next year.

The results of the handing out of samples left with the physicians were cited by George Judisch. Eight cases of self medication resulted from the passing on of information by a patient who had received such a sample. A telephone conversation heard over a rural line was followed by demands upon the pharmacist for the prescription mentioned.

A symposium on uniformity of procedures was the suggestion of Mr Hogstad.

Mr Nelson discussed the open display of the prescription department at the Century of Progress Exposition. The student in charge of the exhibit operates in silence, only occasionally delivering a lecture which prompted many intelligent questions. The exhibit has been a success and suggests that a visible prescription department may be profitable for observation purposes, but should not be used for instruction of the purchaser.

It was moved by Rowland Jones and seconded by many that the paper be accepted and the recommendations considered by the officers of the section.

Dr Frank A Delgado, business specialist of the chemical division of the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce, next presented a paper on 'Proportion of Drug Store Sales Devoted to Public Health—A Summarization of Retail Drug Distribution Facts Derived from the First Census of Distribution'.

According to the data assembled in the first nation wide Census of distribution taken in 1929 approximately 50 per cent of the sales of the 58,258 drug stores in the United States is devoted to prescriptions, drugs and patent medicines, rubber goods, surgical and hospital supplies and other products associated with the professions of medicine and pharmacy and the preservation of public health. Of the sales of drug stores 23 per cent are made in the Northwest central part of the nation and 22 per cent in the Northeast section. Climate has apparently no effect on total drug store sales, and per capita figures must be treated advisedly. The costs of doing business were taken up in detail.

Mr Hogstad moved that a vote of appreciation be given Dr Delgado for his valuable contributions and to Mrs Delgado for her part in such contributions.

Prof Paul Olsen presented a paper on 'The AMERICAN PHARMACEUTICAL ASSOCIATION and the Drug Institute of America, Incorporated'. The paper was freely discussed by George Judisch, F W Meissner, Henry Hein, Rowland Jones and the author.

The First Session of the Section on Commercial Interests was then adjourned.

## SECOND SESSION

The Second Session of the Section on Commercial Interests was held Thursday, August 31st at 9 00 A M The meeting was called to order by Vice Chairman Funk The following papers were presented and discussed 'Publicity and the Pharmacist' by Miss A E Garvin, 'Profits and Prophet,' by C Leonard O Connell 'Actual Time and Costs of Some U S P and N F Preparations,' by Henry Brown, 'National Drug Store Survey—Drug Retailing,' by Charles F Beach 'Pharmacy,' by William Rodman

Following the reading of Mr Rodman's paper a recommendation was made that the Section on Commercial Interests provide for a committee to study the subject of 'visible prescription departments' —Carried

The Committee on Nominations presented the following names for officers of the ensuing year *Chairman*, John A J Funk Indiana, *Vice Chairman* Henry Brown Pennsylvania, *Secretary*, Wm Rodman New Jersey *Delegate to the House of Delegates* Russell B Rothrock, Indiana

On motion duly seconded there being no further nominations, the nominees were elected The officers expressed their appreciation of the honor, following their installation

The Section recommended that a committee be appointed to study the subject of Prescription Departments, and a motion was made by C Leonard O Connell seconded by Anton Hogstad, Jr, that the Chairman of the Section appoint a Committee on Prescription Department —Carried

The Section on Commercial Interests was then adjourned

## SECTION ON HISTORICAL PHARMACY

## FIRST SESSION

The First Session of the Section on Historical Pharmacy was called to order by Chairman Louis Gershenfeld at 9 25 A M August 31st The first order of business was the reading of the Chairman's address— 'Why the History of Pharmacy?' J T Lloyd presided The address follows

## WHY THE HISTORY OF PHARMACY?

BY LOUIS GERSHENFELD \*

Custom decrees that the chairman of your section shall at the interval of a year following his service deliver before you appropriate remarks It has occurred to me that I could best command your interest to a brief consideration of data which concern this section and which as a problem must sooner or later concern every scientific worker associated directly or indirectly with pharmacy No occult reason for the title of these remarks lies behind them Perhaps the only thought I would like to convey in some slight degree is to again demonstrate that to understand and appreciate pharmacy to its fullest extent you must understand and appreciate its history History has a real lesson to teach which I think many in pharmacy have learned too late and even more have not learned at all though greater progress is being made to day It was Cervantes who said History is the depository of great actions, the witness of what is past, the example and instructor of the present and the monitor of the future ' Goethe has expressed himself by stating that the history of a science is science itself The great discoverers themselves with few, if any exceptions do not fail to acknowledge that without the work of their predecessors their achievements would not have been possible

It is indeed to be regretted that there are some men of science who doubt the value of the history of their respective subjects They find therein merely a pleasing branch of literature and accordingly they may even question the wisdom of devoting any time to its study One may possess the historic spirit but be lacking a knowledge of the facts of history The errors the trials and tribulations and the steps of the real progress of any branch of science not only record its evolution but make possible a better understanding and appreciation of its existence and progress If we have no proper appreciation of the previously existing conditions and upon which new principles are imposed, considerable value may be lost and in fact, one may never understand what these new principles challenge

---

\* Chairman Section on Historical Pharmacy

Knowing much of the history of pharmacy we can gain information which would permeate the teaching, practise and research of pharmacy of the future. Here, as well, it is also true that without a historic setting for his work, a man is almost as helpless as is the man who lacks a sense of humor. It is most unfortunate that in some instances even the history of pharmacy has been 'wounded in the house of its friends'. There are some who have denied its value in pharmaceutical education and have refused to admit that those who are not familiar with the history of their profession lack a proper vision and perspective of their calling. There are other over zealous advocates who (perhaps unconsciously) may have wavered somewhat from the true facts when in their attempt to advance the boundaries of pharmaceutical knowledge, they may have made the worse appear as the better or even in few instances ready-made facts (but somewhat distorted) may have been presented for special interests. The position that pharmacy should take is that not only all in its ranks but all educated in pharmacy should have some knowledge of its history.

It is pleasing to note that "Charters' Basic Material for a Pharmaceutical Curriculum" makes the following potent comments. "The history of pharmacy should be taught as a major means of developing professional morale. It should include (a) a description of the origin, evolution and present status of the profession and (b) a study of outstanding pharmacists of the past and present in connection with their contribution to the art and science of healing. This material should be as vivid as possible and should reveal the romance of pharmacy. It will fail in its object if it is a mere recital of bald facts. The textbook on history should be a volume of dramatic literature of compelling interest." The Pharmaceutical Syllabus (Fourth Edition 1932) in the subject matter suggested for a four year curriculum designates the "History of Pharmacy" as a required subject and allots a minimum of 32 hours for its study, with "the object of the course to stimulate the student to think about the evolution of his calling, rather than to drill him so that he may be able to write a creditable examination paper at the close of the course." In concluding the introductory remarks to the outline of the latter, the Syllabus in referring to what the Student may have gotten out of the course remarks "He may even have gotten an inkling of how the present has developed out of the past and thus be enabled to plan more intelligently for the future. If he be not particularly proud of the present, he at least need not be ashamed of the past, and the mere glimpses that he has obtained of the past should impart hope for the future."

'I have always thought,' wrote Ferdinand Hoefer in the introduction of his 'History of Chemistry' (1842), 'that the best method of popularizing scientific studies, generally so little attractive, consists in presenting as in a panorama the different phases a science has passed through from its origin to its present conditions.' Yet let us not forget the words of G. M. Trevelyan,

Every true history must by its human and vital presentation of events force us to remember that the past was once real as the present and uncertain as the future. In presenting pharmaceutical history shall we not concern ourselves with a close analysis of the materials of which this history is composed rather than with a superficial and slipshod presentation of a picture of such history, which in this manner appears formless and even lifeless? Let us not generalize when only insufficient data is available. With a proper sense of proportion and perspective let all who can help to extend the field of our historical observations and criticisms, but let them be presented not for effect or for specific exploitations but with the compelling force of telling the truth for these true experiences of the past may serve as anchors or guide posts for the future of pharmacy.

Pharmaceutical workers are to be presented (in biographies) not as lovable curiosities or with the thought of boasting of their achievements, merely because they were associated with pharmacy. True facts concerning their accomplishments mentioning their worth while deeds as well as their struggles and failures, should be given so that one may be able to gather the romance, the unselfish activity and frequently the hardship of the life of these workers, for such information may help as useful guides and incentives to others. Young scientists may then be able to gather valuable information from the great traditions of the past, build on this heritage for their own future and thus aspire for higher ideals. Even when presenting occasionally a mere catalog of names as may be found advisable, pointing out briefly the accomplishments of workers in pharmacy necessitates frequently (as is customary in a consideration of historical science) having at least some idea of the conditions which prevailed during the various periods in the development of the branch of science under consideration if these very names which are to be mentioned are to



convey some meaning, especially when judgment is to be rendered in the light of present knowledge

The preservation of historical pharmaceutical records is a matter of great importance. It is deplorable, but a fact, that in this country suitable conveniently located housing facilities are not available to any great extent to adequately preserve these records. This lamentable neglect may be remedied soon when the National Pharmacy Headquarters will be established in Washington. It is to be expected that the pharmaceutical archives will be adequately housed here and that a suitable historical museum thus centrally located and under satisfactory supervision will be available. Let us not forget that a properly organized museum can supply a panoramic view of the historical development of pharmacy. The mental impressions thus gained predominantly through the eye, as in models, pictures, specimens, are just as valuable and, perhaps, more so than the printed word. Their perusal can give a good idea of the progress of the knowledge which they embody. They make no demands on one's linguistic powers and they appeal in the same manner and through the same medium through which one may be more frequently accustomed to receive current scientific impressions.

With the thoughts in mind as expressed herein your chairman therefore desires to make the following recommendations: (1) That the Historical Section recommend and urge that the AMERICAN PHARMACEUTICAL ASSOCIATION shall arrange to publish at frequent intervals a request for the donation of historical documents, relics, etc., which will be placed in appropriate places in the Headquarters Building. There are many pharmacists and institutions who do not have conveniently located storage space who would gladly make such presentations.

(2) That the Local Branches, State Associations and other large pharmaceutical organizations be requested to arrange for the appointment of historical committees, the chairmen and members of which shall aid in the procuring of historical relics, documents, etc.,

(3) That the Deans of the various Colleges of Pharmacy be asked to cooperate more liberally with the Section on Historical Pharmacy. Each College of Pharmacy should be represented annually on the program of this Section by at least one paper, and it is suggested the Dean should be requested to assign annually a title for a paper to a member of his staff. If any member of the instructional corps of the several pharmaceutical institutions has served pharmacy for 25 years or more, the Dean or his representative should arrange for the presentation of a biographical sketch of such member to be presented to the Section on Historical Pharmacy, if one has not been sent at a previous occasion,

(4) That the various veteran associations should be requested to appeal to their members and that the older members of our own ASSOCIATION be requested to contribute more liberally of their personal contacts and information concerning Historical American Pharmacy, and

(5) That the secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION be requested to arrange to have available typewritten copies of permanent resolutions made from year to year at the meetings of this section so that the officers of this section may be guided accordingly.

Mr. Lloyd said he had some experience in gathering old and apparently valueless historical specimens. Some years ago he attempted to get some things for Mr. Whitebread from one of the veteran druggists—an old-timer, who had a glass globe that he considered valueless, but as soon as he knew that the Smithsonian wanted it, he put it in his window and you couldn't pry it away from him for anything. Diplomacy is needed to put any old possession in the museum. It is human nature to want what some one else wants.

The Chairman's recommendations were read.

(1) "That the Section on Historical Pharmacy recommend and urge that the AMERICAN PHARMACEUTICAL ASSOCIATION shall arrange to publish at frequent intervals a request for the donation of historical documents, relics, etc., which will be placed in appropriate places in the National Headquarters Building. There are many pharmacists and institutions who do not have conveniently located storage space who would gladly make such presentations."

Motion was made and seconded that the resolution be adopted—Carried.

(2) "That the Local Branches, State Associations and other large pharmaceutical organizations be requested to arrange for the appointment of historical committees, the chairman and members of which shall aid in the procuring of historical relics, documents, etc."

Moved and seconded that the recommendation be adopted—Carried.

(3) "That the Deans of the various Colleges of Pharmacy be asked to cooperate more

liberally with this Section Each College of Pharmacy should be represented annually on the Section on Historical Pharmacy program by at least one paper, and it is suggested, the Dean should assign annually a title for a paper to a member of his staff If any member of the instructional corps of the several pharmaceutical institutions has served pharmacy for 25 years or more, the Dean or his representative should arrange for the presentation of a biographical sketch of such member to the Section, if one has not been prepared on a previous occasion

After some discussion on motion of C O Lee and a second a change was made as follows That 'the Dean should be requested to assign annually a title for a paper to a member of his staff'—Carried

(4) That the various veteran associations should be requested to appeal to their members and that the older members of our own ASSOCIATION be requested to contribute more liberally of their personal contacts and information concerning Historical American Pharmacy"—Adopted

(5) 'That the secretary of the AMERICAN PHARMACEUTICAL ASSOCIATION be requested to arrange to have available typewritten copies of permanent resolutions made from year to year at the meetings of this Section, so that the officers may be guided accordingly'—Carried

The report of the Secretary was called for and presented It reported the activities of his office, the report was accepted

Chairman Gershenfeld appointed the following Committee on Nominations *Chairman*, H W Youngken Arthur Osol and C J Zufall An Historical Note on Official Rosin Cerates,' by J W England was read by F P Stroup

The next paper was read by Lieut Commander L H Roddis on Henrik Ibsen (No discussion)

An illustrated paper by J T Lloyd on 'The Development of the Mortar and Pestle' was presented The author stated that mortars had been intimately connected with pharmacy and had grown up with it He called attention to the development taking place in mortars since very early times up to the present day The greatest change has been in materials Previous to the Wedgewood mortars, marble, brass and bronze were used for mortars The latter were not suited for chemicals The author commented briefly on the pictures as shown on the screen

The next paper was entitled 'An Interesting Collection of Mortars' by Charles H LaWall and Millicent R LaWall which was shown with lantern slides by Arthur Osol

The Secretary made reference to a Chinese mortar which he had seen in a Chinese drug shop He also referred to a mortar in the same establishment where water power was used in connection with mortars In the discussion, the dates of early mortars were asked for and it was brought out that one dated back to 1000 B C It was also stated that in New York there are quite a number of stores devoted entirely almost to the sale of mortars

C W Ballard said that there is an antique shop near the pharmacy of Mr Costello who is well known for his collection of mortars, in which a specialty is the sale of mortars and pestles

The next paper presented was on 'Superstition, Credulity and Skepticism Three Bugbears with Which Pharmacy Has Always Had to Contend,' by Charles Whitebread In the absence of the author it was read by the Secretary

The report of the Historian, E G Eberle was presented It is part of these minutes

### THE HISTORIAN'S REPORT

BY E G EBERLE

Former editor J P Gilmour, of the *Pharmaceutical Journal and Pharmacist* closes an article on 'The Origins of British Pharmacy' by saying Before any piece of research work can safely be entered upon, the would be investigator, if he is to avoid the risk of having been fore stalled, must read up the literature of the relevant subject Similarly, if there is to be a correct orientation and interpretation in other pharmaceutical interests and issues, there must be at least a reconnaissance of the ground to be traversed"

Ground was broken for the Headquarters Building on July 1, 1932 Introductory remarks were made by Dr H A B Dunning chairman of the Building Committees in charge of the ceremonies and were followed by brief addresses by Dr Charles Moore, chairman, Commission of Fine Arts Mr Walter D Adams, president AMERICAN PHARMACEUTICAL ASSOCIATION, Dr Harry A Fowler president Medical Society of the District of Columbia, Sir Henry S Well come honorary president of AMERICAN PHARMACEUTICAL ASSOCIATION, Dr W Bruce Philip

president elect of AMERICAN PHARMACEUTICAL ASSOCIATION Dr S L Hilton, chairman of the Council of the AMERICAN PHARMACEUTICAL ASSOCIATION, raised the first shovelful of earth

Dr Charles Moore said in part

When the AMERICAN PHARMACEUTICAL ASSOCIATION came to the Commission of Fine Arts with their project for a building to occupy a portion of the frontage of the square between Twenty Second and Twenty Third Streets, the Commission joyfully embraced the opportunity to peg down the last of the five spaces with a building appropriate to its close proximity to the Lincoln Memorial and devoted to a purpose at once significant and important to human welfare. It has been difficult—at times it seemed impossible—for the American pharmacists to meet the requirements of additional purchases of land, of costly materials and of gifts to the Government for widening Twenty Third Street. Perhaps John Russell Pope's inspiring design for the AMERICAN PHARMACEUTICAL ASSOCIATION Building had much to do with the successful outcome of the tempestuous voyage through cross seas stirred by conflicting winds, Congressional and otherwise. At any rate we are here to day to break ground for a building which shall stand as a symbol of ethics in trade, honesty and fidelity in ministering to human needs and constant advance in the science of good health.

The building is now completed and Chairman Dunning's report will advise regarding the structure. Above the entrance is the following inscription:

The American Institute of Pharmacy is dedicated to those who have given of their thought and endeavor to the improvement of Public Health and to the further advancement of Science in Pharmacy."

A number of pictures of the steps of progress are shown. A history of the Headquarters building is in contemplation. Fifty years ago in Chicago at the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION steps were taken to establish an international codex for potent medicaments. Quoting from a report of the secretary of the International Pharmaceutical Federation, Dr T. Potjewijd published in the October JOURNAL for 1932—in 1898 the proposition started in Chicago was taken over by Dr Rommeclaire who requested the Académie Royale de Médecine de Belgique to support a motion in which the Belgian Government was invited to take steps in this direction. Finally in September 1902, the conference of Brussels took place, resulting in a number of medicaments being codified as to their method of preparation, composition and quality of active elements. In 1905, the resolutions of this conference were signed, through which fact conventional agreements on these potent medicaments were adopted. The last International Congress of The Hague in 1913 took over the proposition of the conference of Brussels to found a Secrétariat International de Pharmacopées. Prof. A. Tschirch and Prof. L. Van Itallie reported on the methods in which a similar secretaryship ought to function. In 1922, the Federation resumed its activities and expressed its wish that a second conference should be held. This conference convened in Brussels in 1925. The report is continued and accepts the decision that an international pharmacopœia is becoming more and more desirable, and careful consideration should be given to the possibility of establishing an international pharmacopœia. In addition this report indicates the lines along which, in the viewpoint of the members of the Commission, a pharmacopœia of this type can be created. In conformity with a resolution of the General Assembly of the Federation this report was handed to the Belgian Government and to the Hygienic Department of the League of Nations.

In speaking of the Toronto meeting Secretary R. B. J. Stanbury said: The Canadian-American Pharmaceutical Convention was unique in that it drew together representatives of the three great Anglo-Saxon Pharmaceutical Associations—those of the United States, Great Britain and Canada.

It has undoubtedly brought about a better understanding both pharmaceutically and nationally between pharmacists of these three countries. It has served as a stimulus and inspiration to the members of the three organizations, who on account of contact with one another have received a new vision of their opportunities and responsibilities.

Canadian druggists feel happy in having had an opportunity of giving a welcome to our cousins from across the line and our brothers from across the sea. Pharmacy is a profession of service and we are grateful for having had some share in cementing its bonds.

The ASSOCIATION has considerable historical material which should as soon as possible be properly filed and arranged, as the conveniences for doing so have been inadequate. There has

been no great effort made for collecting material, but quite a number have expressed willingness and desire to contribute. The Leadbeater Pharmacy, Alexandria, Va., was acquired at an auction sale for the AMERICAN PHARMACEUTICAL ASSOCIATION on July 19, 1933, the purchase price was provided by L. Manuel Hender of Baltimore, other contributions will be made, and as soon as it is possible to list the items a history of the pharmacy will be prepared for the records of the ASSOCIATION, with due credit to the donors.

The stock which laid the foundation of Edward Stabler's pharmacy in Alexandria was invoiced at £96, 2s and 3d. It was bought through the agency of Townsend Speakman, wholesale druggist of Philadelphia, June 25, 1792. The latter cautioned the buyer to reduce quantities ordered, "apprehending it most for thy interest for thee to have smaller quantities at first till thou hast had some experience." The venture was a success—the stock, purchased by note, was paid for and doubled by the end of the first year, and the young apothecary married Mary Pleasants.

The first stock included three quart flint-glass bottles with glass stoppers, at 5 shillings each. Two of these bottles disappeared—one remains, which was billed as containing spirit of nitre and is part of the purchase for the AMERICAN PHARMACEUTICAL ASSOCIATION. An association in Alexandria contemplates establishing a museum in the storeroom and keeping it open for the public, if so, it is tentatively agreed that the articles purchased will remain in Alexandria so long as the museum is maintained. If not, the items will be moved to the Headquarters Building in Washington.

The clock dates back to the earlier years of the pharmacy. There are many records, books, orders, prescriptions, etc., which connect the history of the pharmacy with the present. A plate on the front counter records where Robert E. Lee received orders to proceed to Harper's Ferry to apprehend John Brown.

A partner in one of the firms was Richard H. Stabler, a former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1870-1871. He died November 18, 1878, aged 58 years, was born and educated at Alexandria, Va., learned the drug business with his father, William Stabler, in this store. He was professor of Pharmacy in the School of Pharmacy of the National Medical College and afterward of the National College of Pharmacy at Washington.

Edward Stabler's earlier pharmaceutical experience was gained in the drug store of his brother, William, at Leesburg, Va. The Leadbeaters first entered into the history of this business in 1830, when John Leadbeater came to this country and was employed in this pharmacy, then owned by William Stabler, the son of Edward. Mr. Leadbeater married a daughter of Edward Stabler and became a partner in the firm of William Stabler & Bro., in 1844, and sole owner in 1852.

The "Spirit of Nitre" bottle, part of the first invoice, the order from Martha Washington, record books, book of formulas, orders from early Alexandria families, counter blotters and prescription files are probably the most valuable part of the purchase.

An outstanding historical collection was brought to this country by the purchase, of E. R. Squibb & Sons from Jo Mayer of Wiesbaden. This has been described by Charles H. LaWall and made the subject of his report before the Conference of Pharmaceutical Research on Saturday, August 26th.

The Pharmacy exhibit at the "Century of Progress"—Chicago World's Fair—presents an outstanding opportunity for acquainting the public with the part of Pharmacy in the advancement of civilization, medical progress and public health service. Pharmacy has been allotted liberal space in the fountain circle—on the ground floor of the Hall of Science among the groups that are related to pharmacy, completing its story to be told by the exhibit and dramatized in a manner that will impress its significance on the visitors.

The Remington Honor Medal for 1932 was formally awarded to E. G. Eberle on October 12th. The formal award for 1933 will be made to Secretary E. F. Kelly, probably in October. The Remington Medal was established in 1918 by the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION by suggestion of Dr. Hugo H. Schaefer. The following have been recipients of the honor: James H. Beal, John Uri Lloyd, H. V. Arny, H. H. Rusby, George M. Berlinger, H. M. Whelpley, H. A. B. Dunning, Charles H. LaWall, Wilbur L. Scoville, Edward Kremers, E. Fullerton Cook, E. G. Eberle and E. F. Kelly.

A number of pharmacopœias have become official since last report. Danish, British, Japanese and a new edition of the Chinese Pharmacopœia has appeared.

The *Innalen der Pharmazie*, *Das Chemische Zentralblatt*, completed their centenaries

It is regretted that the *Apotheker-Zeitung* (New York) has been discontinued after fifty-three years of useful service. Hugo Kantrowitz, the editor, has been an active member of the AMERICAN PHARMACEUTICAL ASSOCIATION for many years, and has been connected with the publication since its founding. During these many years our fellow-member has ably served the readers, most of whom are members of the New York German Apothecaries Society.

The Fourth Edition of the Pharmaceutical Syllabus, outlining the Course of Instruction for the degree of Bachelor of Science in Pharmacy, has appeared. Chairman J. G. Beard has ably directed the work of the Committee and the cooperation of the members and has given us a Syllabus which is not only useful and helpful, but reflects credit on pharmacy.

Leaflet No. 14—"Pharmacy as a Career" is one of a series devoted to a discussion of the professions as a career. It covers the following subjects: Definition and brief history of pharmacy, standards, functions, qualifications, opportunities, women in pharmacy, salaries, census, state requirements, registration, state board examinations, the schools and colleges, degrees, student expenses, closing with a table of schools and colleges, showing for each the total expense, enrollment and degrees awarded in 1932. The inclusion of a leaflet on our profession in this Career Series by the Office of Education is a further recognition of pharmacy by the Government, and the quotations taken from it are both encouraging and significant.

"As the educational requirements for entering the profession of pharmacy have increased there has been a corresponding recognition on the part of the Government of the professional qualifications of pharmacists."

The Council on Medical Education and Hospitals has adopted a resolution commending as one of the Essentials of a Registered Hospital that "the pharmacy of a hospital should be adequately supervised and should comply with State laws."

The centenary of the discovery of chloroform was celebrated by scientific bodies throughout the world. Three scientists are entitled to consideration in connection with the discovery, namely, Samuel Guthrie, of the United States, Baron von Liebig, Germany, and Eugene Soubeiran, of France.

The Fourth International Congress on Medicinal Plants and Perfume-Yielding Substances was held in Paris during the week of July 16th.

The Liebig celebration was held at Giesen, Germany, July 19th, arranged for by the Society for Chemical Industry. Baron von Liebig in his early years was employed in a German pharmacy.

On June 8th a collection of apothecary's ewers and drug jars was sold at Sotheby's sale rooms in London. This was Glogowski's collection from Berlin. Mr. Geoffrey Howard, an authority on the subject commenting on the collection, said: "I doubt if such an extraordinary collection of fifteenth-century pots has been offered for sale within a lifetime. The remarkable thing about these is that, whereas until the sixteenth century figures and inscriptions are hardly ever found, here we have a number of beautiful examples of fifteenth-century drug jars adorned with heads and the names of drugs. Even so, the fifteenth-century jars are distinctly crude in design compared with those of the following century."

A recent brochure of The Hahnemann Medical College of Philadelphia, dated 1932, contains a twelve page description (pages 7 to 18) of the collection of the works of Paracelsus (1490-1541) which belonged to the late Dr. Constantine Hering and is now the property of the College. The works of Paracelsus are of deep interest to the student of the history of chemistry. Dr. Hering collected 189 volumes of the original works, commentaries and translations.

The Seventh International Congress of Military Medicine and Pharmacy, under the presidency of Dr. José González Granda, Inspector of Military Hygiene, was held at Madrid, May 29 to June 4, 1932. The outstanding entertainment function was held in the National Palace when the members of the Congress were received by the President of the Republic, S. E. D. Niceto Alcalá Zamora, thirty-five nations were represented.

Sir Henry Dale, director of the National Institute for Medical Research of England, was the principal speaker at the dedication of the new Merck Research Laboratory on April 25th.

The National Drug Trade Conference has undertaken the preparation of a reference list of drugs and chemicals which properly bear the poison label when dispensed otherwise than upon the prescriptions of physicians. It is a matter of impossibility to form a definition for poison which will serve as an accurate guide in every case; hence this work is very timely and will meet a neces-

sity long recognized. The Committee having this work in charge is composed of A G DuMez S L Hilton, Robert L Swain, A C Taylor and James H Beal, *Chairman*

During March 1932, biologists and medical men celebrated the fiftieth anniversary of the discovery by Robert Koch of the tubercle bacillus

The 50th anniversary of the Red Cross was celebrated May 21 1932. Florence Nightingale was born May 13 1820, Jean Henry Dunant, May 8, 1828

Among the Golden Anniversary celebrants of the state pharmaceutical associations in 1932 were the Maryland, Louisiana, Arkansas and Alabama associations. Mississippi celebrated this year

The limitation of world manufacture of narcotics and the control of drug distribution is undertaken by an international convention signed by the United States at the Geneva Conference on the Limitation of the Manufacture of Narcotic Drugs. A copy of the report of the American delegation to this conference was made public by the Department of State March 7 1932 in which the delegation urged ratification of the convention by the Senate

Decision has been rendered in Chile that only pharmacists holding degrees from the University of Chile can practice pharmacy. Responsibility for enforcement of the law is vested in a director general of public health

Final reports of the Committee on the Costs of Medical Care have been issued, a result of five years of intensive work and involving the expenditure of more than a million dollars

The Pan American Medical Congress was convened at Dallas, Theodore J Bradley presided as chairman of the Section on Pharmacopœias

Our fellow member (1875), of London, England, Dr Henry S Wellcome—prominent pharmacist, researcher, archeologist and head of many other undertakings—was knighted by King George

Professor Charles F Heebner of Toronto was elected honorary president of the AMERICAN PHARMACEUTICAL ASSOCIATION

Prof H G Greenish, after 43 years of service on the staff of the School of Pharmacy (British Pharmaceutical Society) and as dean for many years, has retired. After making this note we learned of his death which occurred on August 2nd, aged 78 years. His work has been of great value in pharmacopœial revisions and standards for drugs and vegetable powders

The *Journal de Pharmacie et de Chimie* for October 1932 is a 'memorial number' commemorating the life and work of the late Dr Leon Grimbert who died September 25 1932, aged 72 years. He was an outstanding member of the Commission for the revision of the French Codex. A list of titles of his contributions requires nine pages and, taking the character of the work represented into consideration, speaks for a record seldom surpassed

Dr W A Puckner, secretary of the Council, on Pharmacy and Chemistry since its organization, died October 1st. Prior to this service he had been a member of the faculty, School of Pharmacy, University of Illinois

Emil Louis Boerner, first dean of the College of Pharmacy of the State University of Iowa, died May 28, aged 78 years. He had been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION for 56 years. Gustave Scherling of Sioux City died May 13, aged 71 years. He had been a member of the ASSOCIATION for forty-nine years

Henry P Thorn, former president of New Jersey Pharmaceutical Association, died October 6th, aged 79 years. He had been a member of the A P H A for fifty-four years

Mrs Emma Rouse Lloyd, wife of our veteran member John Uri Lloyd, died November 28 1932, aged seventy-four years. During the year prior to her death Mrs Lloyd had completed a genealogy of the families to which she belongs—"Clasping Hands with Generations Past"

Mrs Catherine Diehl, widow of the late C Lewis Diehl, died at her home in Louisville. Professor Diehl is remembered by his work for pharmacy

In the foregoing death list of members, those who held membership for fifty years or more are given. The following have served pharmacy and record is here made of work well done, in the memory of the deceased we pause for a moment: Charles F Beeton, Denver, Colo.; Alfred S Burdick, Chicago, Ill.; S Ross Campbell, Ventnor, N J.; Nettie Canary, Chicago, Ill.; Sol L Clarke, Baltimore, Md.; Parker Cook, Baltimore, Md.; August Diehl, New York City; Raymond M Dunean, Pierz, Minn.; John B Ebbs, Waterbury, Conn.; Wilhelm Elfstrand, Lindstrom, Minn.; David M Fletcher, San Francisco, Calif.; Seth Parker Grandy, Mesa, Ariz.

Louis Frederick Grewe, St Louis Mo , Julius Greyer, Cincinnati, Ohio, Lebrecht Gustav Heinrich, Holyoke, Mass , Francis Enlen Holliday, New York City, Lewis B Jones, Chicago, Ill , John Krieger, Salamanca, N Y , Peter M Lockie Buffalo, N Y , Robert McNeil, Philadelphia, Pa , Clare Arthur Onweller, Hudson Mich , Martin L Porter, Danforth, Mo , John A Proben, Garden City L I , N Y , William August Puckner, Chicago, Ill , Carrie Ritter, Springfield, Ohio, Carl Saalbach, Pittsburgh, Pa , Gustav Scherling, Sioux City, Iowa, Lauriston S Smith, Santa Monica, Calif , Edward E Stacy, Tuscola, Ill William Forsyth Steever, Harrisburg, Pa , Edward Strahlmann, San Francisco, Calif Henry Prickett Thorn, Medford, N J , Carl W Thurston, Wentworth, S Dak , Malcolm O Tribble, St Louis, Mo , Nicholas Weisner, Philadelphia Pa , W A Wishart Oakland, Calif , John Austin Yates Edmonton, Ky

A paper on C Lewis Dichtl by John E Kramer, was read by Arthur Osol (No discussion)

A paper by R D Bienfang on Dr John Tennent and Seneca Rattlesnake Root " was read by title Also a paper, ' Binding Up a Wound,' by Fred B Kilmer

'The History of Sharp & Dohme ' by A R L Dohme and C W Brown (Not complete)

The History of Smith, Kline & French Co and Valentine H Smith & Co , of Philadelphia," by J W England

Then followed The History of Frederick Stearns Pharmaceutical Manufacturing Co , "

The History of E L Patch Co " The Growth of Parke, Davis & Co " The First Hundred Years of Norwich Pharmaceutical Co " Certificate of Incorporation and By Laws of the Drug Institute of America, Inc , ' Story of the House of Squibb '

The Secretary stated that Chairman Gershenfeld had secured papers, on the history of some manufacturing houses and that he had promises of further papers along the same lines from other establishments This material will be placed on file for a time and eventually made use of for the historical records presented by them

J T Lloyd presented a paper on ' Fragment of Early Drug History in Ohio the Shakers of Lebanon,' by his father, John Uri Lloyd

He also gave a paper in abstract on ' Gifts of the Gods to Primitive Man "

A paper on The Early Days of Pharmacy in the West,' by John T Moore was read by title

Heber W Youngken presented a paper on ' American Pharmacognosists of the Nineteenth Century ' This paper was illustrated and shown by lantern slides Appreciation was expressed to the author of the paper

The Secretary added his personal appreciation of the late Professor Sayre who was sketched in the paper by Dr Youngken and with whom he was associated for a while

C W Ballard stated that some of the slides made by the late Dr Otto A Wall were used by him in some of his lectures

Dr Youngken remarked that in having slides made, Dr Wall always had duplicates made up which he presented to teachers who were sufficiently interested to use them

The First Session of the Section on Historical Pharmacy was then adjourned

## SECOND SESSION

The Second Session of the Section on Historical Pharmacy was called to order by Chairman Louis Gershenfeld, at 2 10 P M September 1st

A paper on "The History of Pharmacy in Kansas' was presented by title by Secretary Reese, of the Kansas Association

Clyde M Snow presented A Resume of the Activities of the Chicago Branch of the A Ph A '

The Chairman stated that ' this is the first of the local branches that we have a history of We have been trying to get a history of all the state associations and the local associations, and I think this is probably the first of the local associations that we have a complete history of "

President W Bruce Philip expressed his appreciation for the work of this Section

The Chairman recognized Dr Edward Kremers he said in part It was in 1902 that the AMERICAN PHARMACEUTICAL ASSOCIATION established the historical section After the committee had demonstrated the desirability of such work, the ASSOCIATION granted us a Section It was the AMERICAN PHARMACEUTICAL ASSOCIATION therefore that started organized work in connec

tion with the history of pharmacy The French followed, and the Germans were the latest to follow It has been my privilege to point out from time to time the desirability of doing detailed work in Pharmacy If I have preached too much text, it has been to point out the lack of information that we have on so many aspects of the history of pharmacy "

Dr Kremers read the paper—"The First Pharmacopœia "

Dr Edward Kremers read excerpts from "A Contemporary of Lucca Landuci," and commented briefly in answering questions of Dr A R L Dohme

The following papers by the same author were read by title "Dover's Powder" "The Names by Which Paracelsus Has Been Known," "Paracelsus in Literature," "The Apothecary in Literature A Contemporary of Lucca Landuci" "Rewriting of the History of Percolation" The following papers were also read by title "History of the Iowa Pharmaceutical Association" by J M Lindly, also "Early Pharmacy and Pharmacists of Montana" by Charles E Mollett, and "Historical Pharmacy in Minnesota," by Frederick J Wulling

The Chairman called on Dr A R L Dohme to present "The History of Sharp & Dohme" He did that interestingly but very briefly, touching on the mile-stones of the history only The history, when completed is to be presented to the Association

The Committee on nominations was called for and presented by Chairman Heber W Youngken as follows *Chairman*, Louis Gershenfeld, *Secretary*, C O Lee, *Historian*, E G Eberle, *Delegate to the House of Delegates*, J T Lloyd

On motion duly seconded and carried, Dr Edward Kremers was requested to cast a unanimous ballot for the nominees It was so announced

There being no other business, the Section on Historical Pharmacy adjourned

## REPORT OF THE COMMITTEE ON MONOGRAPHS

(See Minutes Scientific Section A PH A, page 1165)

The Monograph on Aconite consists of five complete full chapters Chapter I on Botany Chapter II on Pharmacognosy Chapter III on Chemistry, Chapter IV on Pharmacology and Chapter V on Therapeutics

All the chapters, with the exception of IV and V, are now ready for publication The latter however, will be completed this Fall

Following the corrections and criticisms of the typewritten monograph by the Committee, the monograph should be finished sometime this year

The Committee on Monographs

E E SWANSON, *Chairman*  
W J HUSA,  
C J ZUFALL,  
H W YOUNGKEN  
J C MUNCH

## THE VALUE OF THE A PH A RECIPE BOOK \*

BY J LEON LASCOFF

"Chairman E Fullerton Cook has asked me to select from the Recipe Book for exhibit purposes about 30 or more of the most important preparations for which there is a large use in this country at this time Knowing that 30 preparations are not sufficient to do justice to the importance of this volume, I have prepared about double that number <sup>1</sup>

\* Report made to Joint Session Scientific Section and Section on Practical Pharmacy and Dispensing Also as part of the Symposium on Practicing Professional Pharmacy—See page 1021, October JOURNAL

<sup>1</sup> These were exhibited



"It is a known fact that many drug stores (not pharmacies) have failed recently. The failures have been due mainly to cut prices. It is self evident that now, more than at any other time, the pharmacist should begin concentrating on prescription practice. The time is ripe now for the approach of the pharmacist to the physician, for this very important reason. There has been so much discussion concerning socialized medicine that the physicians are looking for every conceivable opening to protect themselves for the future. They are therefore 'ready for co-operation' with us.

"I met a number of physicians who are desirous and who do prescribe U S P and N F preparations. They prescribe very little from the Recipe Book for the simple reason that they are not sufficiently acquainted with it, because not enough publicity has been given to the book.

"Concerning the pharmacists who have purchased the book, I can only say, that to my knowledge, they have been pleased. I can truthfully state that we have not received any justifiable complaints. Regarding those which we did receive, the complainant was usually at fault, having prepared the formula carelessly. I have received many letters saying that this A P H A Recipe Book is certainly 'the best of its kind.' One pharmacist recommends it to another. This is easily shown by the fact that the publishers have disposed of 4580 volumes.

"A few nights ago, a prominent physician came to our Pharmacy and asked me whether I could fill a prescription calling for Schlesinger's Solution. It had to be sterilized for injection. This was done and sent to him the next morning. He sent me the following letter:

'I wish to acknowledge with thanks the prompt receipt of Schlesinger's Solution.

'You may recall that when I heard from Baltimore that Mr. F. was coming up to New York and that he was to receive Schlesinger's Solution injections, I was at a loss to know what they were and so I consulted you. We both then consulted the Recipe Book and found the formula of Schlesinger's Solution.

'I am very glad to say that the solution is working very satisfactorily.

'Enclosed please find another prescription for double the amount previously called for.'

"In this August issue of the *Druggists Circular*, the following reply was made to a request for books on pharmaceutical and general formulas:

To F. W. N., Ohio.—For pharmaceutical and general formulas you will find the A P H A Recipe Book, the Standard Formulary, Henley's and Pharmaceutical Formulas (British) rich mines. Every druggist ought to have at least two of, and preferably all, these books. *The harder the times, the more he needs them, as they will point out ways in which he can make money, when selling goods at cut-prices may be causing him to lose money.*

"I cannot enumerate the number of times, I have been asked for the formulas for certain preparations which are contained in the Recipe Book. While preparing this paper, I received a call for the formula for Doranti's Solution (on display here). The pharmacist did not have a Recipe Book, but sent in an order to Lippincott when he heard of the many advantages this book offered.

"The first edition of the Recipe Book consists of 1621 formulas grouped as follows:

- 777 Pharmaceutical Formulas
- 373 Hospital Formulas
- 34 Dental Formulas
- 66 Diagnostical Reagents and Clinical Tests
- 28 Veterinary Formulas
- 45 Photographic Formulas
- 184 Cosmetic Formulas
- 45 Flavoring Extracts
- 69 Technical and Miscellaneous Formulas

At the present time the Committee is preparing for a revision of Pharmaceutical Recipe Book Number 1.

'On March 16, 1933, *Bulletin No 1*, prepared by your chairman consisting of twenty pages containing sixty formulas, voting sheets and comments on individual items, was mailed to all the members of the Committee. A compilation of the returns on this bulletin showed that a large majority voted for the inclusion of the new formulas.

Several days ago five new bulletins were mailed. These bulletins include additional new Pharmaceutical Formulas, formulas for Stains and Reagents, a table of Doses, Dental Formulas and a questionnaire as to whether or not to include in the Recipe Book No 2 various suggestions presented.

I was requested to make this paper as short as possible not to exceed a reading limit of ten minutes. I have not, therefore, given the results of the votes taken on the various bulletins already issued. However, I may safely say that a majority were in favor of the items in the approximate proportion of 85% yes and 15% no. All suggestions and criticisms will be considered in due time, and will be submitted before a final vote is taken. I am taking this opportunity to thank all the members of the Committee for their valuable cooperation and prompt replies.

"The following pharmaceutical preparations are on display here:

'Mixture of Mercuric and Potassium Iodide,' 'Astringent Eye Wash,' 'Aromatic Elixir of Glycyrrhiza,' 'Wadsworth's Solution,' 'Yellow Astringent Lotion,' 'Elixir of Calcium Bromide,' 'Phenol Gargle,' 'Hiccough Mixture,' 'Compound Glycerophosphate Elixir,' 'Compound Resorcinol Lotion,' 'Astringent Lotion,' 'Elixir of Barbitol Sodium,' 'White Lotion,' 'Ethereal Liquid Soap,' 'Syrup of Yerba Santa,' 'Iron Citrate Mixture,' 'Inhalation Fluid,' 'Thiersch's Solution,' 'Elixir of Salicylic Acid,' 'Menthol Dusting Powder,' 'Bismuth Paste,' 'Bismuth Subgallate Dusting Powder,' 'Whitfield's Ointment,' 'Whitfield's Ointment with Lanolin,' 'Arnung's Tincture,' 'Aromatic Syrup of Cascara,' 'Tincture Iron Acetate,' 'Ethereal Hemorrhoidal Suppositories.'

'The following are the Hospital Formulas:

'Barium Sulphate Enema (S H F),' 'A B C Diuretic Mixture (B N Y),' 'Poison Ivy Lotion (McNair's),' 'Compound Mixture of Colchicum (B N Y),' 'Compound Chloral Mixture (V C N Y),' 'Anti Rheumatic Mixture No 1 (N Y P G H),' 'Diuretic Mixture (V C N Y),' 'Oeschner's Antiseptic Solution,' 'Ruggie's Tincture,' 'Vincent's Solution for Trench Mouth,' 'Syrup of Chloral,' 'Calamine Oil Lotion,' 'Pusey's Calamine Liniment,' 'Elixir of Iron with Copper (Lankenau Hospital),' 'Creosote and Phenol Inhalant.'

The following are the Dental formulas:

'Liquid Dentrifice,' 'Detergent Tooth Paste.'

The following Stains and Reagents are on exhibit:

'Ringer's Solution,' 'Fehling's Solution (Alkaline),' 'Fehling's Solution (Copper),' 'Benedict's Solution (Qualitative),' 'Benedict's Solution (Quantitative),' 'Dorant's Solution,' 'Loeffler's Solution,' 'Nylander's Reagent,' 'Zenker's Fluid,' 'Gram's Solution,' 'Esbach's Reagent,' 'Solution of Bismarck Brown.'

'Incidentally as Chairman of the Propaganda Committee on U S P and N F of New York State I have called a Joint Meeting of Physicians and Pharmacists for sometime during the latter part of the month of October. At this meeting we are going to discuss the official preparations and those of the Recipe Book.

'The Recipe Book is becoming a valuable book in the prescription work. In our Pharmacy we find it indispensable, having many occasions to use it, along with the Pharmacopœia and Formulary. Every pharmacist should have a copy of the 'AMERICAN PHARMACEUTICAL ASSOCIATION Recipe Book.' He will be well repaid.

'In conclusion I am sure that with constant detailing on the part of the pharmacist to the physician the Pharmaceutical Recipe Book will become one of the foremost reference books in pharmacy. It will prove of invaluable aid to the physician, the dentist, the veterinarian, the laboratory technician, the cosmetician and the manufacturer as well as the retail pharmacist."

---

The other addresses of the Symposium on Practicing Pharmacy will be published in succeeding issues of the JOURNAL.

## EDITORIAL NOTES

*Because of Association Reports, which required many pages, publication of a number of papers and items in this Section had to be deferred*

Secretary E F Kelly, AMERICAN PHARMACEUTICAL ASSOCIATION, is in receipt of the following note from Mrs Alice Greenish, widow of the late Dr H G Greenish *Honorary Member*

I wish to thank you very much for your kind letter of sympathy for me in my great sorrow

"I can assure you that my husband was never happier than when helping fellow pharmacists and it is very gratifying to me to know how highly his work was appreciated Will you please convey to the Pharmaceutical Association my sincerest thanks?"

---

### THE INTERNATIONAL STANDARD FOR THE OESTRUS-PRODUCING HORMONE

At the request of the officers of the Permanent Commission on Biological Standards of the Health Organization of the League of Nations the Board of Trustees of the U S Pharmacopoeial Convention has agreed to assume the responsibility for distributing the International Standard for the Oestrus Producing Hormone in the United States Supplies of this material have just been received from the National Institute for Medical Research London, where the International Standard has been prepared This Standard is now available for the use of manufacturers of preparations of this Hormone for the purpose of establishing for their products a uniform potency in the terms of the International Unit, one International Unit consists of 0.0001 mg of the Hormone issued by the League of Nations This material is also available for those carrying out important therapeutic researches in this field

A memorandum suggesting the course to be followed in using the International Standard has also been supplied by Dr H H Dale Director of the National Institute for Medical Research Those who are interested in securing this memorandum or the International Standard should communicate directly with E Fullerton Cook Chairman of the U S P Committee of Revision 43rd Street and Woodland Avenue, Philadelphia

### MEDICINALS PRODUCED IN PERU OFFER COMPETITION TO AMERICAN PHARMACEUTICALS

The Peruvian pharmaceutical industry has developed rapidly during the past two years, and has affected the imports of drug products Many Peruvian chemists who have studied or been employed abroad manufacture medicines and chemicals The prices at which the locally manufactured pharmaceutical products are offered are far below those of similar imported commodities As price is the dominant factor in the Peruvian market at the present time the national products enjoy a decided advantage Local drug stores recommend national products, the containers and wrappings of many of which closely resemble several well known American drug products

### NATIONAL PHARMACY WEEK WINDOW DISPLAY CONTEST COMMITTEE

BY ANTON HOGSTAD, JR., CHAIRMAN

The following have been appointed by the National Pharmacy Week Executive Committee to serve as the judges in connection with the 1933 National Pharmacy Week Window Display Contest Dr Frank B Kirby, *Chairman* N Chicago Ill, Prof Robert Terry, University of Illinois, School of Pharmacy Chicago, Paul J Mandabach, Chicago Dr Prentiss McKenzie, Chicago, George L Secord, President, Chicago Retail Druggists' Association, Chicago

The Chairman of the National Pharmacy Week Executive Committee has requested the secretaries of the respective State pharmaceutical associations to forward photographs of the window displays that were awarded first prize in the various state contests Such photographs will be immediately forwarded to the National Pharmacy Week Window Display Contest Committee of which, as will be noted above, Dr Frank B Kirby is serving as chairman

The 1933 contest closes December 31st and all photographs should be mailed as soon as possible so as to facilitate the work of the National Pharmacy Week Window Display Contest Committee

This Committee will select the national winner, said winner to be awarded the Grand Prize, a silver loving cup, donated by the Federal Wholesale Druggists' Association. After the winner has been decided upon, the National Pharmacy Week Window Display Contest Committee will report same to the National Pharmacy Week Executive Committee which in turn will release the announcement to the pharmaceutical press shortly after January 1, 1934.

## PERSONAL AND NEWS ITEMS

The Wellcome Prize, including the Wellcome Gold Medal, for 1933 has been awarded to Major Edgar Erskine Hume, Medical Corps, U S Army, librarian of the Army Medical Library, Washington, for his essay on 'The Value of Studies in Health and Sanitation in War Planning'. The Wellcome Prize and Medal were established by Sir Henry S Wellcome, London, in 1916, and are awarded annually through the Association of Military Surgeons of the United States.

Dr V E Henderson, professor of pharmacy and pharmacology at the University of Toronto, and Dr G H W Lucas, associate professor, have been experimenting for the past two years with cyclopropane.

Ohio Northern University recently conferred upon Dean C B Jordan the honorary degree of Doctor of Science. President Williams, in presenting this degree, stated that it was presented because of Dean Jordan's accomplishments as 'Dean of the School of Pharmacy at Purdue University, author of many published papers in pharmaceutical science, authority on pharmaceutical education, chairman of the Executive Committee of the American Association of Colleges of Pharmacy for many years past, author of the important textbook for pharmacy and medical students'.

The Minneapolis Association of Retail Druggists on November 28th sponsored a testimonial dinner in honor of John W Dargavel who was elected secretary of the National Association of Retail Druggists at its last convention.

F C Schramm, pharmacist of Salt Lake City, has been moved up in line as officer in the Supreme Council of the Ancient and Accepted Scottish Rite of Freemasonry, at the recent meeting in Washington.

Dean Frederick J Wulling has delivered a series of radio addresses which have received

appreciation of the "listeners in" and served the public and pharmacy.

The J K Lilly Fellowships, Purdue University, provide for a year's graduate study for two high-ranking scholars. One of them has been granted to G L Baker, who is a graduate of the Colorado University College of Pharmacy and of the University of Florida School of Pharmacy, having received the degree of Master of Science from the Florida school. The other recipient is Karl Kaufman, who is a graduate of the Ohio State University College of Pharmacy.

## BANQUET IN HONOR OF THE INSTITUTION OF NORTHERN NEW JERSEY BRANCH, A PH A

About one hundred guests, visitors and friends attended a banquet in Newark November 20th, in honor of the institution of New Jersey Branch, A Ph A. Robert William Rodman presided as toastmaster, the speakers were President Robert L Swain, Secretary E F Kelly and Dr Ernest Little, President of the newly organized branch. The following were guests of honor: Walter R Woolley, President, New Jersey Pharmaceutical Association, Prescott R Loveland, Secretary, New Jersey Pharmaceutical Association, Robert P Fischelis, Secretary, New Jersey State Board of Pharmacy, Frank H Eby, President, Philadelphia Branch, A Ph A, Ernst A Bilhuber, President, New York Branch, A Ph A, Charles W Holton, Treasurer, AMERICAN PHARMACEUTICAL ASSOCIATION, Henry V Army, Dean, Columbia University College of Pharmacy, Eugene G Eberle, Editor, JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION. The latter showed slides of the steps in the progress of the American Institute of Pharmacy, also of proof sheets of the first U S P, a statement from the Mercer Pharmacy in Fredericksburg, an order from Martha Washington to Leadbeater Pharmacy.

The following constituted the banquet committee: George C Schicks, *Chairman*, Louis Wait Rising and Robert William Rodman. The officers of the Branch are: *Honorary President*, Philemon E Hommel, *President*, Ernest Little, *Vice President*, George C Schicks, *Secretary*, Louis Wait Rising, *Treasurer*, Adolph F Marquer. The pleasures and interest of the occasion were enhanced by the attendance of ladies.

## OBITUARY

## JOSEPH M. ARMITAGE

We are just in receipt of isolated advice of the sudden death of our fellow member, Joseph M. Armitage, of Princeton, Minn., on July 6th, of apoplexy. The deceased was born in Limerick, Ireland, September 16, 1875, the son of Thomas and Agnes Armitage. The family resided in Canada for several years, thereafter, they lived in Bay Mills, Mich., Philadelphia and Lilly, Pa., and then, in 1898, located in Princeton, Minn. Here, Dr. Armitage purchased a drug store and his brother Joseph assumed the management, in 1923 Miss Margaret entered the pharmacy with her uncle and has conducted the business with him until his demise, when she assumed full management and ownership. The former was a conservative business man and was devoted to the profession of pharmacy.

Mr. Armitage was active in the Masonic bodies and highly regarded by his fellow-citizens. He is survived by Mrs. T. L. Armitage and her two daughters, Misses Margaret and Mary.

## WALTER V. SMITH

Walter Valentine Smith, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1902, died November 8th at his home in Germantown, Philadelphia, aged 65 years. He was the son of Valentine Smith, founder of one of the oldest wholesale drug houses of Philadelphia.

The deceased was educated in the public schools of Philadelphia, Nazareth Hall and Lauderback's Academy, and was graduated from the Philadelphia College of Pharmacy in 1887. He assumed management of Valentine H. Smith & Co., on the death of his father. In 1929 this firm was consolidated with Smith, Kline & French Co. of which corporation he became president. Mr. Smith was active in the affairs of the National Wholesale Druggists' Association as vice president and as member of the Board of Control for a number of years.

He was a member of Pennsylvania and New Jersey pharmaceutical associations, president of Philadelphia Drug Exchange 1900-1902, and of other drug organizations. For a number of years until his demise he was a member of the board of trustees of his *Alma Mater*.

He was a member of the Masonic bodies and interested in church work, a trustee of the Bethlehem Presbyterian Church.

His wife, Mrs. Harriet B. Smith, two daughters and four grandchildren survive, also, three sisters and a brother, Howard E. Smith.

## WILLIAM H. OWENS

William H. Owens, Granville, N. Y., member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1917, died in Jersey City Medical Center, November 3rd. He was born in Wales, December 31, 1866, and came to Granville with his parents in 1870.

Mr. Owens was graduated from New York College of Pharmacy in 1905, and soon after graduation purchased the drug store of C. J. Hake in Jersey City. He was a member of Hudson County Retail Druggists Association, and New Jersey Pharmaceutical Association. He was chairman of the Advisory Board of La Fayette Trust Company and took an active part in civic affairs. He was a member of La Fayette Reformed Church, Granville, where the funeral services were held. He is survived by his brother, Glenn Owens, of Granville.

## ADOLPH F. MENGES

Adolph F. Menges, prominent Madison, Wis., druggist for 42 years, died at his home October 20th, aged 69 years.

Mrs. Menges took an active part in the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION, as chairman of the Ladies Auxiliary. Mr. Menges' health did not permit him to take an active part in the convention.

Graduated from the University of Wisconsin in 1886, Mr. Menges opened a pharmacy on his own account in 1891. For a time he operated three other drug stores, being the first to operate a group of pharmacies in Madison. He was a charter member of the Wisconsin board of pharmacy, on which he served from 1895 to 1905. He was also a charter member of the Wisconsin Pharmaceutical Association.

In addition to his drug store operations, Mr. Menges was prominent in Madison business life through his connections with other institutions. He was the first president of the Commercial National Bank, now the Commercial State Bank. He was one of the founders

of the National Guardian Life Insurance Co and was a vice president of that concern at the time of his death. He also was a director of the Union Trust Co.

#### HARRY ARMAND STEBBINS

Harry A. Stebbins, assistant manager of the New York office of Merck & Co., New York, died October 14th in Chicago, where he was attending the exhibit of his house at the Century of Progress Exposition. He was fifty-seven years old.

Mr. Stebbins entered the employ of the New York office of Powers & Weightman in 1900. When in 1903 that company was merged with Rosengarten & Co., also of Philadelphia, becoming the Powers-Weightman-Rosengarten Company, he continued in its service. He was with the company thirty-seven years, until 1927, in that year the company was sold to Merck & Co. and Mr.

Stebbins became assistant manager of the New York office.

He was a member of the New York College of Pharmacy, and of the Drug and Chemical Club.

The death has been announced of M. Auguste Baudot of Dijon. His volume on the ancient drug pots of Burgundy is familiar to all who have studied the history of old French pharmaceutical pottery.

Dr. Albert Calmette, of the Pasteur Institute of Paris, died October 29th, aged seventy years, and on November 3rd Dr. Emil Roux, the director of the Institute, passed away, aged eighty years. They had been life-long friends.

Pharmacist Rear Admiral Dr. Shuhei Isono, retired, passed away in Tokyo, October 16th, aged 56 years.

---

### SOCIETIES AND COLLEGES

#### AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION

Early sound, constructive revision of the Federal Food and Drugs Act was approved by the American Pharmaceutical Manufacturers' Association in its Fall business meeting held in the Washington Hotel, Washington, D. C.

In a resolution stating its attitude toward the proposed revision of the drug law, the association, while approving the purpose of the so-called "Tugwell" bill, regretfully disapproved that measure because of its form. Preparation of a satisfactory, effective substitute for the "Tugwell" bill was suggested, and it is planned to present such a substitute at the hearings of the "Tugwell" or Copeland bill.

Hearings on the Copeland Bill by the special sub-committee of the Senate Committee on Commerce have been tentatively scheduled to begin December 7th.

Walter G. Campbell, chief of the Food and Drug Administration, addressed the pharmaceutical manufacturers on the need for revision of the Food and Drugs Act. He expressed his willingness to accept any 'reasonable' amendments to the Copeland Bill designed to achieve the ends desired by the Administration, without undue hardship to

legitimate business. Following this, Charles Wesley Dunn, chief counsel of the Association, suggested many changes in the pending bill. His suggestions will be the basis of the Association's preparation of a substitute measure.

Dr. F. J. Cullen, chief of drug control under the Federal act, attended the session and answered questions by members of the Association on matters of labeling and other practices under the Food and Drugs law.

The pending NRA code for pharmaceutical manufacturers was discussed. The draft of this code is still being amended from time to time and it has not yet reached the form in which it probably will be brought to hearing.

#### A. O. A. C. ADOPTS PLAN SOLICITING ENDOWMENT

The Association of Official Agricultural Chemists closed its forty-ninth annual meeting with the adoption of a plan to solicit endowment of its research work by some philanthropic foundation and by election of a Canadian as its *President* for the first time in its history, he being R. Harcourt of the Ontario Agricultural College, Guelph, Canada.

Other officers for the coming year are: *Vice President*, F. C. Blanck, United States Bureau of Chemistry and Soils, Washington; *Secretary*, W. W. Skinner, Bureau of Chemis-

try and Soils, Washington, and additional *Members of the Executive Committee*, H H Hanson, Dover, Del C C McDonnell Washington, H R Kraybill, La Fayette, Ind, and the *Returning President* Dr J W Kellogg, Harrisburg, Pa

The resolution authorizing the president to appoint a committee to interest foundations engaged in educational or public welfare activities in endowing research work for the Association was in response to a suggestion advanced by Dr J W Kellogg in the annual address of the president Taking as his topic 'The Regulatory Chemist of To day and To morrow,' Dr Kellogg attempted an assay of the Association and an estimation as to how it would fit into the picture of the new deal

#### NEW JERSEY BOARD OF PHARMACY

Following an impressive custom established several years ago certificates of registration were awarded to 87 newly registered pharmacists by Governor A Harry Moore at the State House Trenton, on Tuesday October 24 1933 The exercises incident to the awarding of these certificates were presided over by Vice President James A Bauman of the Board of Pharmacy, and addresses were made by Governor A Harry Moore Secretary Prescott R Loveland of the New Jersey Pharmaceutical Association and Secretary Robert P Fischels of the New Jersey Board of Pharmacy The various chapters of the Code of Ethics of the AMERICAN PHARMACEUTICAL ASSOCIATION which was signed by all of the registrants were read by Albert J Smith, C Graham McCloskey and Dean B Crawford members of the Board

Governor Moore, in his remarks to the newly registered pharmacists, urged them to so conduct their professional affairs as to make it unnecessary for the state at any time to revoke their license to practice

#### TEXAS PHARMACEUTICAL ASSOCIATION

The 1934 meeting of Texas Pharmaceutical Association will be held at Mineral Wells, and will include the 12th annual drug show The Executive Committee convened in Dallas the following attended the meeting

Lee Stinson of Snyder, Association President, Earl T Phillips of Big Spring, Vice Chairman of the Committee, Walter D Adams of Forney, Secretary Treasurer, John B Ray of Abilene, Henry F Hein of San

Antonio, E B Oliver of Longview, Sam P Harben of Richardson, B B Brown of Dallas, C C Harris of Houston and Lee Tyler of Houston Secretary of the Houston Pharmaceutical Association Also visiting the group were C B Allison of Dallas, President and Walter H Cousins of Dallas Secretary of the Texas Board of Pharmacy, who were welcomed to the meeting, P V Keating, public relations director and assistant editor of the *Texas Druggist* and Miss Mary Ivey, assistant to Secretary Adams

#### RICHMOND RETAIL DRUGGISTS' ASSOCIATION

The Richmond Retail Druggists' Association was organized on August 21st and has held several well attended meetings Membership in the association is restricted to registered and assistant registered pharmacists, proprietors and managers of retail stores At most 100% of the retail stores are represented in the organization The regular meeting date is the second Monday in each month at 8 00 P M at the Medical College of Virginia Dr W G Crockett is the secretary

#### RHO CHI REPORT

An 8 page bulletin reports the annual Rho Chi meeting in Madison Wis it includes the reports of the National President, National Secretary and National Treasurer, and a message from the National President Glenn L Jenkins The bulletin concludes with a summary of 16 Chapter reports to the 1933 convention

#### AUSTRIAN PHARMACEUTICAL SOCIETY

The meeting of the Austrian Pharmaceutical Society was held October 20th, in Vienna The president of the Society is Dr Richard Firbas and the secretary is our *honorary member*, Dr Hans Heger Among the contributors to the program were Prof Dr R Wasicky, Pharmacy and Biology ' and Prof Dr L Kofler, on Microchemistry of the Opium Alkaloids '

#### OFFICERS OF NEW YORK DRUG AND CHEMICAL GROUP

The following officers were elected by New York Drug and Chemical Group *Chairman* Samuel W Fraser, *Vice Chairman*, Herman G Weicker, *Treasurer*, S Barksdale Penick,

of the National Guardian Life Insurance Co and was a vice president of that concern at the time of his death. He also was a director of the Union Trust Co.

### HARRY ARMAND STEBBINS

Harry A Stebbins assistant manager of the New York office of Merck & Co New York died October 14th in Chicago, where he was attending the exhibit of his house at the Century of Progress Exposition. He was fifty seven years old.

Mr Stebbins entered the employ of the New York office of Powers & Weightman in 1900. When in 1903, that company was merged with Rosengarten & Co also of Philadelphia becoming the Powers Weightman Rosengarten Company, he continued in its service. He was with the company thirty seven years until 1927, in that year the company was sold to Merck & Co and Mr

Stebbins became assistant manager of the New York office.

He was a member of the New York College of Pharmacy, and of the Drug and Chemical Club.

The death has been announced of M Auguste Baudot of Dijon. His volume on the ancient drug pots of Burgundy is familiar to all who have studied the history of old French pharmaceutical pottery.

Dr Albert Calmette of the Pasteur Institute of Paris, died October 29th, aged seventy years, and on November 3rd, Dr Emil Roux, the director of the Institute, passed away, aged eighty years. They had been life long friends.

Pharmacist, Rear Admiral Dr Shuhei Isono retired passed away in Tokyo October 16th, aged 56 years.

---

## SOCIETIES AND COLLEGES

### AMERICAN PHARMACEUTICAL MANUFACTURERS' ASSOCIATION

Early sound constructive revision of the Federal Food and Drugs Act was approved by the American Pharmaceutical Manufacturers Association in its Fall business meeting, held in the Washington Hotel Washington D C.

In a resolution stating its attitude toward the proposed revision of the drug law the association while approving the purpose of the so called 'Tugwell' bill, regretfully disapproved 'that measure because of its form. Preparation of a satisfactory effective substitute for the 'Tugwell' bill was suggested and it is planned to present such a substitute at the hearings of the 'Tugwell' or Copeland, bill.

Hearings on the Copeland Bill by the special sub committee of the Senate Committee on Commerce have been tentatively scheduled to begin December 7th.

Walter G Campbell chief of the Food and Drug Administration addressed the pharmaceutical manufacturers on the need for revision of the Food and Drugs Act. He expressed his willingness to accept any 'reasonable' amendments to the Copeland Bill, designed to achieve the ends desired by the Administration without undue hardship to

legitimate business. Following this, Charles Wesley Dunn chief counsel of the Association suggested many changes in the pending bill. His suggestions will be the basis of the Association's preparation of a substitute measure.

Dr F J Cullen, chief of drug control under the Federal act attended the session and answered questions by members of the Association on matters of labeling and other practices under the Food and Drugs law.

The pending NRA code for pharmaceutical manufacturers was discussed. The draft of this code is still being amended from time to time and it has not yet reached the form in which it probably will be brought to hearing.

### A O A C ADOPTS PLAN SOLICITING ENDOWMENT

The Association of Official Agricultural Chemists closed its forty ninth annual meeting with the adoption of a plan to solicit endowment of its research work by some philanthropic foundation and by election of a Canadian as its *President* for the first time in its history, he being R Harcourt, of the Ontario Agricultural College Guelph, Canada.

Other officers for the coming year are *Vice President*, F C Black, United States Bureau of Chemistry and Soils, Washington. *Secretary Treasurer*, W W Skinner, Bureau of Chemis



try and Soils, Washington, and additional Members of the Executive Committee, H H Hanson, Dover, Del, C C McDonnell Washington, H R Kraybill, La Fayette Ind, and the Retiring President, Dr J W Kellogg, Harrisburg, Pa

The resolution authorizing the president to appoint a committee to interest foundations engaged in educational or public welfare activities in endowing research work for the Association was in response to a suggestion advanced by Dr J W Kellogg in the annual address of the president Taking as his topic The Regulatory Chemist of To day and To morrow," Dr Kellogg attempted an assay of the Association and an estimation as to how it would fit into the picture of the new deal "

#### NEW JERSEY BOARD OF PHARMACY

Following an impressive custom established several years ago certificates of registration were awarded to 87 newly registered pharmacists by Governor A Harry Moore at the State House, Trenton on Tuesday October 24, 1933 The exercises incident to the awarding of these certificates were presided over by Vice President James A Bauman, of the Board of Pharmacy, and addresses were made by Governor A Harry Moore Secretary Prescott R Loveland of the New Jersey Pharmaceutical Association and Secretary Robert P Fischels of the New Jersey Board of Pharmacy The various chapters of the Code of Ethics of the AMERICAN PHARMACEUTICAL ASSOCIATION which was signed by all of the registrants were read by Albert J Smith, C Graham McCloskey and Dean B Crawford, members of the Board

Governor Moore, in his remarks to the newly registered pharmacists, urged them to so conduct their professional affairs as to make it unnecessary for the state at any time to revoke their license to practice

#### TEXAS PHARMACEUTICAL ASSOCIATION

The 1934 meeting of Texas Pharmaceutical Association will be held at Mineral Wells, and will include the 12th annual drug show The Executive Committee convened in Dallas, the following attended the meeting

Lee Stinson of Snyder Association President Earl T Phillips of Big Spring, Vice Chairman of the Committee, Walter D Adams of Forney, Secretary-Treasurer, John B Ray of Abilene, Henry F Hein of San

Antonio, L B Oliver of Longview, Sam P Harben of Richardson B B Brown of Dallas C C Harris of Houston and Lee Tyler of Houston, Secretary of the Houston Pharmaceutical Association Also visiting the group were C B Allison of Dallas, President, and Walter H Cousins of Dallas Secretary of the Texas Board of Pharmacy, who were welcomed to the meeting, P V Keating, public relations director and assistant editor of the *Texas Druggist* and Miss Mary Ivey assistant to Secretary Adams

#### RICHMOND RETAIL DRUGGISTS' ASSOCIATION

The Richmond Retail Druggists' Association was organized on August 21st and has held several well attended meetings Membership in the association is restricted to registered and assistant registered pharmacists, proprietors and managers of retail stores Almost 100% of the retail stores are represented in the organization The regular meeting date is the second Monday in each month at 8 00 P M at the Medical College of Virginia Dr W G Crockett is the secretary

#### RHO CHI REPORT

An 8 page bulletin reports the annual Rho Chi meeting in Madison, Wis, it includes the reports of the National President, National Secretary and National Treasurer, and a message from the National President, Glenn L Jenkins The bulletin concludes with a summary of 16 Chapter reports to the 1933 convention

#### AUSTRIAN PHARMACEUTICAL SOCIETY

The meeting of the Austrian Pharmaceutical Society was held October 20th in Vienna The president of the Society is Dr Richard Firbas and the secretary is our *honorary member*, Dr Hans Heger Among the contributors to the program were Prof Dr R Wasicky, Pharmacy and Biology and Prof Dr L Kofler, on Microchemistry of the Opium Alkaloids "

#### OFFICERS OF NEW YORK DRUG AND CHEMICAL GROUP

The following officers were elected by New York Drug and Chemical Group Chairman Samuel W Fraser, Vice Chairman, Herman G Weicker, Treasurer, S Barksdale Penick,

*Secretary*, Ray C Schlotteerer, *Executive Committee*, Gustave Bayer, James S Dahl, J F Hayes, Joseph A Huisking, Warner James, David L Kaltman, Paul Muller, John Powell, John J Reiner, A A Teeter,

A A Wasserscheid, *Representative of the Section as Director in the Board*, George Simon. At the suggestion of the nominating committee an advisory council was created, which consists of the latest five former chairmen

## LEGAL AND LEGISLATIVE

### FACT-FINDING INQUIRY ON PROFITEERING CHARGES

'Elimination of profiteering and strict compliance with codes is to be the present concern of the National Recovery Administration

'Returning from a speaking and investigating tour of the Middle West, Administrator Hugh S Johnson declared that most of the complaints against NRA are caused by failure to comply with codes in effect

'A hearing has been scheduled for December 12th, before Division Administrator A D Whiteside, to consider all complaints of profiteering by industries operating under NRA codes. Agricultural commodities and those not covered by codes will not be considered. The hearing, which will be conducted as a fact-finding inquiry, will receive complaints that retailers and manufacturers are making unjustifiable price increases and blaming them on increased costs of operation under their codes "

### A G MURRAY, AID TO CONSUMERS' BOARD

The Food and Drug Administration has named A G Murray, senior chemist, to co-operate with the Consumers' Advisory Board in the hearings of industrial codes pertaining to food, drug and cosmetic products. Through Mr Murray the Administration will make available for the protection of the consumer the technical information of its staff and the experience gained during 27 years of administration of the Food and Drugs Act

Mr Murray will advise in the formulation of codes for the pharmaceutical, package medicine and cosmetic industries. Consumer protection factors in advertising, labeling, sanitary conditions and sale of harmful preparations will, so far as possible be made to conform with the proposed new Food and Drugs Act which will come up for hearing on December 7th

### WHOLESALE DRUGGISTS' HEARING ON CODE

The wholesale drug trade took no formal part in the hearing, November 13th, on the proposed code for the general wholesaling or distributing trades. Dr H J Ostlund representing the National Wholesale Druggists' Association, and R E Lee Williamson, representing the Federal Wholesale Druggists' Association, were present merely as observers.

Officials of the NRA had promised the wholesale drug trade a separate code, but it was said that that was prior to the adoption of a plan for a general wholesale code. However, with a view of ironing out the situation and if possible, meeting the request of wholesale druggists, an informal conference of wholesale druggists with Dr Kenneth Dameron, Deputy Administrator, was held November 20th.

### RETAIL DRUG COUNCIL PLAN OUTLINED TO ASSOCIATIONS

Problems of organization occupied the newly formed National Retail Drug Trade Council, but data are not yet in hand for fixing the code to be added to all retail prices.

Instructions for setting up local retail drug councils in every congressional district and in the major metropolitan centers were sent out to all state pharmaceutical associations. This work is to be completed before January 1st, and preliminary regulations for establishing the local groups and defining their duties and powers were issued with the approval of the National Recovery Administration.

### NEW YORK PHARMACEUTICAL CONFERENCE RESOLUTIONS

The New York Conference adopted resolutions seeking to re-instate the Stop Loss provision. It was urged that the term 'cost' should be defined as the printed and published wholesale cost as issued by various manufacturers, or as published in the recognized price catalogs of the drug trade. That Pro

visions be made for identifying merchandise Modification is sought of Article Nine, Section 1, Paragraph C and Schedule A, Section 4, Paragraph A

### LOCAL AND STATE LEGISLATION

Drug stores in Reno, Nevada, may not sell cigarettes A city ordinance prohibiting such sales has just been sustained by the State Supreme Court, which ruled that the action was within the police powers of the municipality A price war was responsible for the ordinance, the drug stores being held by the city officials to be at fault in underselling established tobacconists

Colorado may finance a \$3 000,000 public works program by means of a cigarette tax Governor Johnson has stated that he may include such a proposal in his forthcoming call for a special session of the Legislature

Montana's new chain store tax, enacted by the 1933 Legislature, is being attacked in court by the Standard Oil Co., which claims that filling stations and bulk storage plants are not

retail and wholesale stores within the meaning of the act

West Virginia's chain stores tax will be the subject of a hearing, December 18th, before a three judge Federal court The constitutionality of the new act is being attacked by several chain store organizations

We are advised by the Houston Retail Druggists Association of a plan which may have dangerous possibilities and druggists should be warned, so that they may use their influence to frustrate the spread of this plan

"The plan seems to be to send a high grade salesman into the community and first contact the ministers and priests of all churches in an effort to get the ladies of their church into a meeting At this meeting the need of church funds is skilfully used to induce interest in the plan A number of ladies are invited to sign up with the company, agreeing to use their influence in getting all ladies of the church to buy certain brands of merchandise Labels are saved, collected and sent in to the company for a 2% commission which is given to the church

---

### BOOK NOTICES AND REVIEWS

Ibañez in his *Análisis de Alimentos* has very successfully adhered to his plan of compiling a manual of practical value to the Spanish pharmacist His thorough understanding of the agricultural and industrial problems of Spain and his sound scientific knowledge has enabled him to present very lucidly the immense service that a country pharmacist, with adequate training, can render his community not only from the hygienic point of view, that is, detecting adulterations, but by giving the necessary help to farmer and small manufacturer

In many regions of Spain the problems of adulteration are relatively unimportant, on the other hand, many abnormalities may be observed due to defective elaboration It is in these small communities, where the principal natural resources are agricultural and where exist many industries of food products derived from them, that the pharmacist has a definite opportunity to promote his own and the community's welfare

The book is divided into two parts, the first consists of the lectures given for the third time at the Real Colegio de Farmacéuticos de Madrid, and the second includes the methods

of analysis Ibañez has endeavored to select from the various modern methods of assay the simplest and most readily performed in small laboratories His chapters on water, vinegar, etc., are examples

Of special interest is the chapter on wine His intimate and first hand knowledge of the subject can be readily appreciated in the discussions which are quite exhaustive, and the tests and assays are practical

The reader will find the same intimate and interesting comprehension of the subject on the sections devoted to Spanish pimento and Spanish saffron In this last subject, as in most topics in the book, the possibilities of adulteration of the Spanish product are considered in a very practical way

Ibañez' book is an interesting, readable treatise on food analysis and is of great value to the Spanish pharmacist and to those interested in Spanish food products—AMELIA MESA DE PONCE

*Bentley and Driver's Text-Book of Pharmaceutical Chemistry*, second edition, revised by JOHN EDMUND DRIVER, Ph D., M Sc., A I C., Lecturer on Chemistry in the University

College of Nottingham published by the Oxford University Press, London, 1933, XXV + 538 pages, 40 illustrations

This well-known text the first edition of which appeared in 1925 originally was written to meet the needs of those studying for the Pharmaceutical Society's Diplomas and for Degrees in Pharmacy. The book has been completely revised and largely rewritten so that the text now meets the requirements of those studying for any of the examinations in pharmaceutical chemistry of the Pharmaceutical Societies, Boards or Universities of the British Empire.

The subject matter is presented in three parts and an appendix. Part I Analytical 71 pages is concerned with a general consideration of the methods by which the purity of pharmaceutical substances is determined. In this arrangement such subjects as the use of physical instruments, the preparation and use of volumetric solutions, gravimetric and volumetric methods of analysis, indicators and the determination of  $p_H$  values are brought together and repetition is avoided. Part II, Inorganic 144 pages, deals principally with the inorganic compounds used extensively in pharmacy and the metal salts of organic compounds are included in this section. A brief general account of the chemistry of each element is followed by a description of such of its derivatives as are defined in monographs of the British Pharmacopœia. In the monographs on individual substances, the impurities for which tests are described in the British Pharmacopœia are enumerated. Descriptions of the tests are given only in cases of special interest or where the reactions are obscure. Part III, Organic 288 pages gives a systematic account of organic chemistry, particular emphasis being laid upon substances of pharmaceutical importance. Explanatory descriptions of alkaloidal assay processes are also included in this part. The Appendix 16 pages, includes tables for the identification of inorganic substances, notes on the identification of organic compounds, classified list of quantitative determinations, acid and alkali indicators and determinations in which they are used, periodic classification of the elements, and a table of atomic weights. Practical work including the preparation and purification of inorganic and organic compounds, qualitative tests and analytical determinations is given for many substances.

The text is based upon and is intended to be used in conjunction with the British Pharmacopœia. This fact limits the use of the book in our schools. The inclusion within the scope of a single volume of the subjects of inorganic qualitative organic and quantitative chemistry, while suited to the purposes for which the text is intended, further limits its use in this country where the tendency is toward texts restricted in scope to a single field of chemical work. The book will be found of value as a reference work, however, since most of the processes and substances considered are the same as or similar to those employed in the United States. In reviewing the book, one is impressed by the very great amount and variety of subject matter treated in a clear, concise and systematic manner in a volume of its size.—GLENN L. JENKINS

*Jungle Memories* by HENRY H. RUSBY  
Whittlesey-McGraw-Hill, publishers. Price \$3 50

In his inimitable way Dr. Rusby brings to light his experiences encountered in his expedition to Bolivia and Chile from 1885 to 1887. The account is of interest both to the layman as well as the scientist, since besides exciting incidents and vivid descriptions of the South American jungle, he has included scientific observations that only a man of his broad education could accurately record. As most scientists know, Dr. Rusby has contributed greatly to our knowledge of such important drugs as Quinine, Cocaine and Cocaine. The manner in which the latter drug is employed by the natives is fully described by him in this volume.

This book has both a cultural and scientific value for every one, since it is rich in exciting incidents as well as botanical and anthropological data—and through it all runs a thread of the author's unflinching sense of humor. The book is dedicated to Pharmacists—perhaps because Dr. Rusby has been identified with an unrelenting struggle in behalf of pure drugs.

This publication records only a part of his adventures. Besides exploring the Amazon Valley twice, he has made expeditions to Arizona and New Mexico, has spent almost a year in the forests along the Orinoco and has explored the headwaters of the Magdalena River while searching for new sources of Quinine in Columbia.—VICTOR LEWITUS, in *New York Journal of Pharmacy*

# JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL XXII

DECEMBER, 1933

No 12

## J LESTER HAYMAN

Joseph Lester Hayman, president of the Conference of Pharmaceutical Association Secretaries, 1932-1933, was born June 3, 1896, at Whitesville, Sussex County, Delaware—the son of Dr E H and Rosa M Hayman. The family moved to Murray City, Ohio, in 1902, and here the youth received his early education, much of the time, after school hours, was spent in his father's pharmacy. After graduating from the Murray City, Ohio, and the Ann Arbor, Michigan, high schools, the young man entered the College of Pharmacy of the University of Michigan, where he earned the Ph G and B S degrees. Soon after graduation, he accepted an instructorship in the Department of Pharmacy at the University of West Virginia. He was rapidly promoted on the faculty to Associate Professor of Pharmacognosy, which position he now holds. In 1924, he returned to the University of Michigan to receive the Master of Science in Pharmacy.

The subject of this brief sketch became a member of the AMERICAN PHARMACEUTICAL ASSOCIATION in 1924. In 1926, he was elected secretary-treasurer of the West Virginia Pharmaceutical Association and has been reelected since then, his monthly letters to the members are distinctive. He is member of the House of Delegates and chairman of the Membership Committee for West Virginia of the AMERICAN PHARMACEUTICAL ASSOCIATION. He was elected to serve as secretary of the Conference of Pharmaceutical Associations, which was formed in St. Louis to discuss and prepare a retail druggists' NRA Code.

J Lester Hayman and Alice Lucille Bennett were married September 18, 1920, in Athens, Ohio. They have one daughter, Alice Margaret, aged twelve, and recently lost their only son, aged three years.

# EDITORIAL

E G EBERLE, EDITOR

10 West Chase Street, BALTIMORE, MD

## THE SEASON'S GREETINGS

PARTS of an editorial of a previous year are repeated in the following "We are prone to view the opportunities of other activities as more promising, but proper search and endeavor reveal that the 'acres of diamonds' are where we concentrate our well-directed efforts. Whatever the passing year may have been, a new year is expressive of hope, which, according to Jeremy Collier, 'is a vigorous principle, it is furnished with light and heat to advise and execute, it sets the head and heart to work, and animates a man to do his utmost. And thus, by perpetually pushing and assurance, it puts a difficulty out of countenance, and makes a seeming impossibility give way'."

Ten years ago the A P H A Headquarters was little more than a dream, now it has become a realization, for on January 1st the officers of the ASSOCIATION will be located in its beautiful home at Constitution Ave and 22nd Street, N W, Washington, D C<sup>1</sup>

We express to all members our *Christmas Wish* for a joyful season of gladness, health and happiness. The *New Year Message* is one of hope—that the financial and industrial activities may improve, and confidence and courage be strengthened with return of greater prosperity

---

## FOOD, DRUG AND COSMETIC LEGISLATION

AT ITS first meeting, in 1852, the AMERICAN PHARMACEUTICAL ASSOCIATION adopted seven objects, the first being "To improve and regulate the drug market by preventing the importation of inferior, adulterated or deteriorated drugs and by detecting and exposing home adulterations." The third object included "encouraging home production and manufacture in the several departments of the drug business." The ASSOCIATION has a commendable and consistent record in supporting every effort to enact and strengthen national and state legislation regulating the strength, quality and purity of drugs, medicines and medical supplies. Its proceedings show that this subject has been considered, in some form, at every annual meeting. Its officers and members have had an important part in drafting and securing the enactment of every state and national law relating to pure drugs.

They took a prominent place, so far as drugs were concerned, in the Pure Food and Drug Congress, the body that brought about the adoption of the Pure Food and Drugs Act of June 30, 1906, which has since been the basis of similar legislation by every state of the Union and which was pronounced by a select committee of the British Parliament as the most effective legislation on the subject by any of the civilized nations. To their credit, medicine and pharmacy had developed satisfactory standards for drugs and preparations, in the U S P and N F, which were adopted in the Act.

Twenty-seven years of enforcement have very naturally brought to light a number of omissions and defects in the law. Developments in this field have

---

<sup>1</sup> Post office address, 2215 Constitution Ave Washington D C

brought about other deficiencies, especially with respect to the control of advertising Cosmetics which were not included have increased tremendously in popularity and use

The few amendments to the Act adopted by Congress, while improving, have not remedied the situation Collateral legislation, such as that with respect to use of the mails and to the regulation of interstate commerce, has aided materially in the correction of abuses but has not checked them satisfactorily Various officials of the governments and others have suggested amendments from time to time without much success other than to draw attention to the need for them The belief has grown in recent years that the Act should be amended or completely rewritten to afford the protection that the public requires in the selection and use of these products which so materially affect public health and the welfare of the people With the advent of the present administration, this proposal was given active support by the officials of the Department of Agriculture, leading to the drafting of a complete revision which was introduced by Senator Copeland, S 1944, and by Representative Sirovich, H R 6110

In 1914, the AMERICAN PHARMACEUTICAL ASSOCIATION suggested the organization of the National Drug Trade Conference made up of delegates from the national pharmaceutical associations, to bring about concerted action of the profession and industry on matters of general interest to all branches and has consistently supported it The Conference has functioned successfully and now embraces nine national associations Its first effort was to represent pharmacy in securing the Harrison Act regulating narcotics It has had a part since that time in the consideration of all national legislation affecting pharmacy and the drug industry Through the Conference, the profession and industry can present a united front in support of or in opposition to any matter not controversial among its member associations and without restricting the freedom of any association to take care of questions of particular interest to them The Conference meets annually and functions, in the interim, through an Executive Committee representing each member association

The movement to amend or rewrite the Food and Drugs Act naturally had the immediate attention of the Conference The officials were requested to grant a meeting which was arranged for April 27th, last The representatives of the Conference expected to see and discuss the draft of the proposed legislation Instead, they were requested to submit suggestions which they were not prepared to do The result was a general discussion, after which the offer of later cooperation in drafting the legislation was made The next development was the introduction of the Copeland and Sirovich bills as drafted by officials and representatives of the Department of Agriculture and which have had wide publicity and discussion in the pharmaceutical press and at many meetings It will be recalled that Mr W G Campbell, Chief of the Food and Drug Administration, addressed the Madison meeting and that after full consideration of the bill, the following resolution was adopted

*Resolved* that the AMERICAN PHARMACEUTICAL ASSOCIATION record its approval of the proposed changes in the Federal Food and Drug Law in so far as they provide for more effective protection of the public health and be it further

# EDITORIAL

E G EBERLE, EDITOR

10 West Chase Street, BALTIMORE, MD

## THE SEASON'S GREETINGS

PARTS of an editorial of a previous year are repeated in the following "We are prone to view the opportunities of other activities as more promising, but proper search and endeavor reveal that the 'acres of diamonds' are where we concentrate our well-directed efforts. Whatever the passing year may have been, a new year is expressive of hope, which, according to Jeremy Collier, 'is a vigorous principle, it is furnished with light and heat to advise and execute, it sets the head and heart to work, and animates a man to do his utmost. And thus, by perpetually pushing and assurance, it puts a difficulty out of countenance, and makes a seeming impossibility give way'."

Ten years ago the A P H A Headquarters was little more than a dream, now it has become a realization, for on January 1st the officers of the ASSOCIATION will be located in its beautiful home at Constitution Ave and 22nd Street, N W, Washington, D C <sup>1</sup>

We express to all members our *Christmas Wish* for a joyful season of gladness, health and happiness. The *New Year Message* is one of hope—that the financial and industrial activities may improve, and confidence and courage be strengthened with return of greater prosperity

---

## FOOD, DRUG AND COSMETIC LEGISLATION

AT ITS first meeting, in 1852, the AMERICAN PHARMACEUTICAL ASSOCIATION adopted seven objects, the first being "To improve and regulate the drug market by preventing the importation of inferior, adulterated or deteriorated drugs and by detecting and exposing home adulterations." The third object included "encouraging home production and manufacture in the several departments of the drug business." The ASSOCIATION has a commendable and consistent record in supporting every effort to enact and strengthen national and state legislation regulating the strength, quality and purity of drugs, medicines and medical supplies. Its proceedings show that this subject has been considered, in some form, at every annual meeting. Its officers and members have had an important part in drafting and securing the enactment of every state and national law relating to pure drugs.

They took a prominent place, so far as drugs were concerned, in the Pure Food and Drug Congress, the body that brought about the adoption of the Pure Food and Drugs Act of June 30, 1906, which has since been the basis of similar legislation by every state of the Union and which was pronounced by a select committee of the British Parliament as the most effective legislation on the subject by any of the civilized nations. To their credit, medicine and pharmacy had developed satisfactory standards for drugs and preparations, in the U S P and N F, which were adopted in the Act.

Twenty-seven years of enforcement have very naturally brought to light a number of omissions and defects in the law. Developments in this field have

---

<sup>1</sup> Post office address, 2215 Constitution Ave., Washington D C



brought about other deficiencies, especially with respect to the control of advertising Cosmetics which were not included have increased tremendously in popularity and use

The few amendments to the Act adopted by Congress, while improving, have not remedied the situation Collateral legislation, such as that with respect to use of the mails and to the regulation of interstate commerce, has aided materially in the correction of abuses but has not checked them satisfactorily Various officials of the governments and others have suggested amendments from time to time without much success other than to draw attention to the need for them The belief has grown in recent years that the Act should be amended or completely rewritten to afford the protection that the public requires in the selection and use of these products which so materially affect public health and the welfare of the people With the advent of the present administration, this proposal was given active support by the officials of the Department of Agriculture, leading to the drafting of a complete revision which was introduced by Senator Copeland, S 1944, and by Representative Sirovich, H R 6110

In 1914, the AMERICAN PHARMACEUTICAL ASSOCIATION suggested the organization of the National Drug Trade Conference made up of delegates from the national pharmaceutical associations, to bring about concerted action of the profession and industry on matters of general interest to all branches and has consistently supported it The Conference has functioned successfully and now embraces nine national associations Its first effort was to represent pharmacy in securing the Harrison Act regulating narcotics It has had a part since that time in the consideration of all national legislation affecting pharmacy and the drug industry Through the Conference, the profession and industry can present a united front in support of or in opposition to any matter not controversial among its member associations and without restricting the freedom of any association to take care of questions of particular interest to them The Conference meets annually and functions, in the interim, through an Executive Committee representing each member association

The movement to amend or rewrite the Food and Drugs Act naturally had the immediate attention of the Conference The officials were requested to grant a meeting which was arranged for April 27th, last The representatives of the Conference expected to see and discuss the draft of the proposed legislation Instead, they were requested to submit suggestions which they were not prepared to do The result was a general discussion, after which the offer of later cooperation in drafting the legislation was made The next development was the introduction of the Copeland and Sirovich bills as drafted by officials and representatives of the Department of Agriculture and which have had wide publicity and discussion in the pharmaceutical press and at many meetings It will be recalled that Mr W G Campbell, Chief of the Food and Drug Administration, addressed the Madison meeting and that after full consideration of the bill, the following resolution was adopted

*Resolved* that the AMERICAN PHARMACEUTICAL ASSOCIATION record its approval of the proposed changes in the Federal Food and Drug Law in so far as they provide for more effective protection of the public health and be it further

*Resolved*, that in the interest of a sound public policy the delegation of arbitrary discretionary powers in connection with the enforcement of Food and Drug legislation be disapproved "

At the annual meeting of the Executive Committee, on November 1st, this legislation was made an important topic for consideration at the annual meeting of the National Drug Trade Conference on December 5th. Dr. James H. Beal was requested, because of his long experience with and through knowledge of the subject, to prepare a complete report on the Copeland Bill and its probable effects on pharmacy and the drug industry. This report was a masterly discussion of the bill and of its defects and dangers so far as pharmacy is concerned. It conceded that certain conditions should be controlled but showed that this could be done most effectively by amendments to the present Act, thus preserving the mass of judicial decisions under it and the state acts and making simpler the necessary amendments of the latter by the several states. After full consideration, the Conference authorized a special committee representing each member association and with Dr. Beal as chairman, to prepare the report for submission to the Senate Committee having the bill in charge, to draft such amendments to the present Act as are necessary to control advertising, etc., and to represent the Conference at the hearing on the bill on October 7th.

The committee sat in Washington on December 6th, and prepared an amended copy of the Act embodying the various suggestions for its improvement. Chairman Beal was selected to represent the Conference and as the first speaker for pharmacy at the hearing, at which time his report and the amended act were to be submitted.

Secretary of Agriculture Wallace opened the hearing on December 7th, which was before a sub-committee consisting of Senators Copeland, McNary and Caraway and of the Senate Committee on Commerce, in support of the bill and was followed by Mr. Campbell who explained each section, covering several hours, submitting information and examples in support of them.

Dr. Beal was called, following Mr. Campbell as the first speaker in opposition and was introduced by President Carson P. Frailey of the Conference. He spoke for almost two hours, during which he had splendid attention and gave the objections of the Conference to the bill and its suggestion for the amendment of the present Act to correct the deficiencies which the Conference not only "admitted" but "asserted," should be corrected in the public interest. The hearing adjourned at about 7:00 P. M.

On December 8th a number of speakers were heard in favor of and against the bill, which completed the hearing. It is expected that the Copeland Bill will be completely amended or discarded in favor of amendments to the present Act—Dr. Beal, S. L. Hilton and E. F. Kelly were the A. P. H. A. delegates to the Conference. Many other members of the Association were present as delegates from the other associations. The American Pharmaceutical Association has strongly supported the Conference and has worked closely with it under the conviction that such a representative body is required to deal with matters of general interest.

The Conference did a splendid work for pharmacy in supporting the purposes of the Copeland Bill, in opposing the provisions it considered as unsound and dangerous and in submitting, in correct form, the amendments to the present Food

and Drugs Act which will effectively protect the public health and welfare Every pharmaceutical interest should support the Conference —E F Kelly

---

### STUDIES IN PROFESSIONAL ACCURACY

RECOGNIZING the need for accuracy in professional pharmaceutical work, the AMERICAN PHARMACEUTICAL ASSOCIATION has appointed a committee to study the whole field of prescription compounding with the object of establishing acceptable tolerances in this exacting branch of pharmacy Important data have already been collected regarding prescriptions for capsules, powders, pills, and other types and classifications The work has received the cooperation of boards of pharmacy, and several colleges of pharmacy have participated in the studies which have been made

No doubt some few years may be required to complete the task However, once the field has been covered adequately, information will be available upon which to base authoritative conclusions regarding the degree of accuracy which should be met with in prescription practice At the present time, no one is in position to state what tolerances or deviations should be permitted, or what accuracy should be required Law enforcement officials, when dealing with prescription compounding, must rely on their unsupported and purely arbitrary judgment It is the purpose of the ASSOCIATION to supply the facts which will enable enforcement officers to act wisely and with due consideration to the many variables which must be taken into account

A closely related study has been assigned to the Committee on Weights and Measures This committee will undertake the collection of factual information dealing with the weighing and measuring apparatus now found in drug stores It is recognized that professional accuracy is largely dependent upon accurate apparatus It is, therefore, important that a study be made of the professional and technical equipment available in the drug store for professional work In fact, in some states, legislation is being proposed to enable the board of pharmacy, or some other state agency, to determine what scientific and professional equipment a drug store must possess The AMERICAN PHARMACEUTICAL ASSOCIATION has undertaken the job of ascertaining the actual facts so that legislation, if any is needed, may be in accordance with known conditions

It is felt that the Committees on Prescription Tolerances and on Weights and Measures have an unusual opportunity for constructive work, a work which will greatly aid in the development of professional pharmacy and be of real value to the practicing pharmacist —R L SWAIN, *President*

---

### LOOKING BACKWARD AND THINKING FORWARD

THE beginning of another year prompts thoughts of activities that have engaged us and of the possibilities in which we may share during the year to come

While much preliminary work had been done in preparation for a headquarters building for the AMERICAN PHARMACEUTICAL ASSOCIATION, systematic plans were

formulated at a meeting in Washington of its Executive Committee and other members of the ASSOCIATION At this meeting—on December 7, 1923—faith was expressed, based on what pharmacy had done and on its greater opportunities and possibilities

Those who attended the meeting referred to, expressed confidence in the success of this important undertaking, because of what pharmacy had accomplished, and the need for greater accomplishments as a duty to maintain Pharmacy's place as a profession and a public health activity, and extend its service

American Pharmacy was then entering upon a new and important undertaking and those interested looked back to the past, surveyed the present and considered the possibilities of the future—it resulted in a call to duty which implied that pharmacists should do no less than had been done The expression of faith has resulted in a building on one of the most beautiful sites of Washington and the structure has been declared by the press, laity, as well as pharmacists and groups of the drug trade, as representative of the finest art and architecture

As Chairman H A B Dunning said at the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION

We now have ready for occupancy and use the first unit of an institution which will we believe, develop rapidly and will become the real headquarters of professional pharmacy in this country This unit is a credit to the ASSOCIATION and to all those who have cooperated in providing it It illustrates what it is possible for pharmacy to do and should stimulate all of us to see that our profession is provided with such a home as is appropriate to its purposes and as will enable it to function most effectively for the American people and American pharmacists '

It is for us to look again to the past, survey the present and consider the possibilities of the future Considering the number engaged in pharmacy, a small monthly individual contribution for the year 1924 would create an Endowment Fund which would for all time take care of overhead and running expenses of the building

As Chairman Dunning reported

The research laboratories chemical physical and biological, will be housed in a separate building which has been provided for and which will be erected as soon as the present building can be occupied and the questions in connection with it settled The general plans for the laboratory building are already under consideration

Three state associations have contributed special funds for designated purposes The Texas Pharmaceutical Association for furnishing the offices of the Editor, the Maryland Pharmaceutical Association for furnishing the offices of the Secretary and the Kansas Pharmaceutical Association have not as yet decided for what their fund is to be used Suitable acknowledgment will be made of these splendid contributions and it is hoped that the other state associations will make contributions for special purposes, thus emphasizing the close relations between them and the AMERICAN PHARMACEUTICAL ASSOCIATION and associating the name of each of them with the project "

The fine support given by pharmacists and drug-trade activities to the AMERICAN PHARMACEUTICAL ASSOCIATION accomplished much this year, true, it may be that the greatest results have been corrective, for properly shaping legislation, but those who have given thought to what might have been realize the great importance The location of the headquarters in Washington will bring greater opportunities, consequent achievements and results

## SCIENTIFIC SECTION

BOARD OF REVIEW OF PAPERS—*Chairman*, L W Rowe George D Beal, F F Berg, C O Lee, E V Lynn, John C Krantz Jr, Heber W Youngken

### A NEW FIELD OF INVESTIGATION IN PHARMACOGNOSY THE MICROSCOPY OF GLANDULAR PRODUCTS

BY HEBER W YOUNGKEN AND ALLAN W REED

While numerous advances have been recorded in pharmacognostic investigation, new vistas opened and many refinements in technique developed during the past decade, a very important field, strange as it may seem, has apparently been overlooked. We refer to the microscopy of powdered, desiccated glandular products.

These substances of animal origin have within recent years increased in the favor of the medical profession and the amounts and kinds used have steadily enlarged. Competition between manufacturers has been keen and imminent danger of adulteration and substitution exists, since no means of identification of the altered tissue elements found in these products has been previously recorded.

It thus became obvious, if these products were to receive official recognition in our works on standards, some means for their adequate standardization would have to be provided. At the request of Chairman E N Gathercoal, of the National Formulary Revision Committee, the senior author was induced to try his hand in an attempt to solve what appeared to be an almost unsurmountable problem, *i e*, the description of the histological elements found in various of these products. The literature had been searched and no record of any results of such work could be found.

#### MATERIALS AND METHODS

The glandular products examined consisted of fresh and preserved pituitary body, anterior pituitary, posterior pituitary, whole ovary, corpus luteum, desiccated strips of these and powdered, desiccated products, specially prepared from authentic materials without contamination and representing the powders of the aforementioned and ovarian residue. Cattle and hogs yielded the products.

Some of the glands were embedded in celloidin, stained, sectioned and studied under the compound microscope in comparison with figures in recognized texts on animal histology. This examination was of help in establishing the relationship of regions and tissues. But it early became apparent that the knowledge gained therefrom was of little value in identifying the altered elements in the powdered products. The next step consisted in separating layers and in teasing apart the various regions of the preserved glands and the macerated dried strips, examining these in water, and in other temporary mounts with various reagents and stains, and in comparing the histological elements observed with similarly mounted powdered, desiccated gland materials.

The reagents and stains employed included the following



## NOTES ON THE WATER OF CRYSTALLIZATION OF QUININE SULPHATE \*<sup>1</sup>

BY GEORGI DENTON BEAL<sup>2</sup> AND CHESTER R. SZALKOWSKI<sup>3</sup>

### INTRODUCTION

According to U S P X, quinine sulphate contains "7 or 8 H<sub>2</sub>O," and "effloresces rapidly when exposed to dry air or when heated to 50° C, losing all but two molecules of its water of crystallization and becoming lusterless." Among the "Tests for purity," we read "Quinine sulphate loses not more than 16.2 per cent when dried to constant weight at 100° C (water)."

Inquiry among pharmacists developed the fact that the U S P description, rubric and directions for storage in well-closed containers were not regarded as of serious moment. As a matter of fact, this instability of the water of crystallization is seldom mentioned in pharmaceutical literature. Cowdley<sup>4</sup> says that while it is generally stated that anhydrous quinine sulphate is only obtained at temperatures exceeding 110° C, his carefully controlled experiments show that the salt readily became anhydrous at 100° C, and that when freely exposed to the air in the anhydrous state it rapidly absorbs water to become a dihydrate. The freshly crystallized salt contains 7 to 8 molecules of water, and when exposed to the air it rapidly effloresces to the dihydrate.

H. B. Parsons<sup>5</sup> reported the water of crystallization of 1015 samples of quinine sulphate as determined by him. One Gm. of each was dried in the water oven for three hours with the following results:

Brand	No. Samples	Average Percentage Moisture
American	16	13.72
American	194	12.61
German	12	12.32
German	634	14.19
Italian	169	14.36

Each sample reported represented 100 ounces from a previously unopened can. The differences above noted in the water of crystallization in the five brands reported were said to be tolerably constant and characteristic for each brand.

W. A. Spalding<sup>6</sup> weighed the contents of two quinine sulphate containers and repeated the weighings at intervals extending over twelve months for the first and eight months for the second. He observed a constant loss, 8 to 9 per cent for the first and 11.39 per cent for the second.

F. A. Thompson<sup>7</sup> found an average moisture content of 11.74 per cent in 183 samples, all of which responded to the other U S P tests for purity.

\* Scientific Section, A. P. H. A., Madison meeting 1933.

<sup>1</sup> Published by permission of the Chairman of the Committee of Revision, U S P XI.

<sup>2</sup> Assistant Director, Mellon Institute of Industrial Research, Pittsburgh, Pa.

<sup>3</sup> Assistant in Research in Pure Chemistry, Mellon Institute.

<sup>4</sup> *Pharm. J. Trans.* (Sept. 2, 1876), 189.

<sup>5</sup> *PROCEEDINGS A. P. H. A.* 32 (1884) 457.

<sup>6</sup> *Ibid.*, 34 (1886), 605.

*Ibid.* 40 (1892) 267.

- 1 Delafield's hematoxylin
- 2 Borrel's methylene blue
- 3 Mallory's connective tissue stain
- 4 Eosin and hematoxylin (1% aqueous solution of each mixed and filtered)
- 5 Eosin (1% aqueous solution)
- 6 Osmic acid (0.5% and 1% solution in distilled water)
- 7 Silver nitrate (1% and 3% solution in distilled water)
- 8 Picric acid (1% solution in distilled water)
- 9 Gold chloride (1 Gm in 35 cc distilled water)
- 10 Acid fuchsin (1% aqueous solution with 0.1 cc diluted HCl added to each 100 cc of solution)
- 11 Phosphotungstic acid (1% aqueous solution)
- 12 Hematoxylin and alum solution
- 13 Acetic acid (15% aqueous solution)
- 14 Iodine water (ss iodine crystals in distilled water)
- 15 Eosin and methylene blue (1% aqueous solution of each, mixed and filtered)
- 16 Van Gieson's connective tissue stain (Curtis modified method)
- 17 Sulphuric acid (10% and concentrated)

Both the compound and binocular types of microscopes were used in the microscopic examination of the materials in sections and powder. The dissecting microscope was employed in the separation of the layers and in teasing apart the tissues, preparatory to mounting and later study under the compound microscopes.

#### POWDERED DESICCATED WHOLE PITUITARY

This occurred as a gray to yellowish gray amorphous powder with a characteristic odor and a saline and disagreeable taste.

The microscopical elements detected were as follows:

Numerous yellowish masses of polyhedral cells surrounded in parts by connective tissue, the latter staining blue with Mallory's stain. Numerous large, polyhedral chromophile cells with central rounded nuclei and coarse cytoplasmic granules staining red with acid fuchsin, the nuclei colored blue and the cytoplasm reddish purple with eosin and methylene blue solution, numerous cubical to low columnar chromophobe cells with or without distinct cytoplasmic granules whose nuclei are stained light blue and cytoplasm paler blue with eosin and methylene blue, both chromophile and chromophobe cells frequently with minute fat droplets colored brown to black with 0.5% osmic acid solution, few cells containing a colloidal substance and appearing greenish in water mounts, few segments of blood vessels of tubular, hyaline nature, the cut ends of which showed serrated dark outlines when examined in silver nitrate solution, numerous mossy neuroglia fragments, the cells with spherical nuclei and elongated, branching processes, numerous elongated somewhat ovoid multipolar cells with few bluish black processes when viewed in phosphotungstic acid and hematoxylin reagent, a few small faintly basophilic, polyhedral cells from the pars intermedia with pale blue nuclei and a pink, granular cytoplasm when stained with hematoxylin and eosin, a number of angular hyaline fragments, fragments of nerve fibres with or without a bulbous end, the axons of which are colored mauve with eosin and hematoxylin, a few cells colored black with osmic acid solution, a number of spindle shaped, bipolar nerve cells.

#### POWDERED DESICCATED ANTERIOR PITUITARY

This occurs as a yellowish brown amorphous powder with a characteristic odor and saline taste. It is partially soluble in alcohol, ether, water and acetone.

The histological elements detected were as follows:

Numerous yellowish masses of polyhedral cells surrounded in parts by connective tissue, the latter staining blue with Mallory's stain, numerous large polyhedral chromophile cells with



central rounded nuclei and coarse cytoplasmic granules staining red with acid fuchsin, the nuclei colored blue and the cytoplasm red purple with eosin and methylene blue solution, numerous cubical to low columnar chromophobe cells with or without distinct cytoplasmic granules whose nuclei are stained light blue and cytoplasm paler blue with eosin and methylene blue, both chromophile and chromophobe cells frequently with fat droplets colored brown to black with 0.5% osmic acid solution, colloidal material occurring between certain of these cells appearing greenish in water mounts, a few scattered cylindrical nerve fibres often attached to fragments of blood vessels, appearing hyaline in water mounts, their axis cylinders staining a mauve color with eosin and hematoxylin solution, few segments of blood vessels with cut ends showing crescent inner endothelial margins and best seen in silver nitrate solution, a few spheroidal cells with reddish brown lipid content colored black with 0.5% osmic acid solution, a few fragments of colloidal substance of greenish aspect in water mounts

#### POWDERED POSTERIOR PITUITARY

This occurs as a yellowish or grayish amorphous powder with a characteristic odor and a saline, disagreeable taste. It is partially soluble in water, alcohol, ether and chloroform.

The following histological elements were detected

Numerous fragments of neuroglia tissue with spheroidal nuclei and long slender branching processes best distinguished with 1% phosphotungstic acid and hematoxylin which stains the nuclei blue and the processes bluish black, numerous spindle shaped bipolar nerve cells, a number of ovoid, multipolar nerve cells whose cell bodies sometimes contain pigment granules and whose several processes appear bluish black in phosphotungstic acid and hematoxylin mounts, fragments of nerve fibres with or without a bulbous end some of the bulbous ends of which are surrounded by cells containing a greenish yellow colloidal substance, the axons of the nerve fibres colored mauve with eosin and hematoxylin solution, a few amyloid bodies of ovoid or crescent shape staining a deep purple with iodine water, many irregular hyaline fragments

#### POWDERED DESICCATED WHOLE OVARY

This product occurs as a pale buff to yellowish brown, amorphous powder, the predominance of yellow or brown in the color combination depending upon the ratio of corpus luteum to other ovarian substance, the species of the animal yielding the product and the period at which the ovaries were removed from the animal. It possesses an odor resembling ground mash and a salty, disagreeable taste. It is slightly soluble in water, alcohol, ether and petroleic ether.

The following histological elements were observed

Numerous young Graafian follicles and fragments of older Graafian follicles the young follicles appearing as spherical to oval shaped bodies containing a central cell or oocyte which is colored deep blue with hematoxylin and alum solution surrounding the oocyte occurs a single layer of flattened follicular cells whose nuclei are stained deep blue with Delafield's hematoxylin while attached to parts of the follicle is a small amount of connective tissue which is colored pink with eosin solution and blue with Mallory's stain, a few scattered cubical to low columnar and transitional germinal epithelial cells occurring singly or in groups with a round central nucleus and granular cytoplasm, the granules glistening in water mounts the nucleus staining a deep blue with Delafield's hematoxylin, a number of small, compact masses of dense, white fibrous connective tissue consisting of white collagenous fibres and fibrocytes the fibres appearing long narrow transparent, with distinct, pointed ends difficult to discern in water mounts but staining a brilliant red in acid fuchsin, the bundles of fibres showing numerous fibrillae which exhibit a dark outline when mounted in 3% aqueous solution of silver nitrate, the fibrocytes appearing irregularly polygonal to slightly elongated, usually forked at one end in surface view and spindle shaped in profile view the nuclei staining a deep blue and the cytoplasm a pale blue to purplish blue with Delafield's hematoxylin, few scattered spindle shaped smooth muscle fibres with

centrally placed nucleus clearly visible in gold chloride T S few capillaries of tubular hyaline nature occasionally branched and grayish to grayish black in outline with 1% silver nitrate solution fragments of larger blood vessels with circular to oval cut ends, their endothelial layer at ends being serrated and taking a pink color with eosin and hematoxylin occasional large spherical cells containing globules of lipid substance which stains black with 1% osmic acid solution, scattered segments of non-medullated nerve fibres of cylindrical form and consisting of neuraxon and neurolemma, the neuraxon taking a blue color with Delafield's hematoxylin a mauve color with hematoxylin and eosin solution and a deep red with acid fuchsin, numerous interstitial cells of rounded to ovate form, some of them slightly beaked containing granules and shining fat globules their nuclei staining a deep blue and their cytoplasm a pink color with hematoxylin and eosin, numerous lutein cells appearing yellow in water mounts, when the material contains corpora lutea, the cells large, polyhedral to oval, often in masses each containing a central nucleus lutein granules and fat droplets

When 1 Gm of powdered desiccated whole ovary is mixed with water to form a smooth paste and about 0.5 cc of sulphuric acid is added to this paste, a reddish brown to deep red color is produced within 15 seconds

#### POWDERED DESICCATED OVARIAN RESIDUE

This represents the whole ovary from which the corpus luteum has been separated by means of a scalpel, ground, dried, powdered and sifted. But the perfect separation of corpus luteum is not always carried out in practice

The powder, therefore, contains the same elements as that of powdered, desiccated whole ovary but only a relatively small number of lutein cells

It may also be distinguished from powdered, desiccated whole ovary by the following test

When 1 Gm of ovarian residue is mixed with 1 cc of sulphuric acid, a yellowish green or fig color is produced

Upon the addition of about 0.5 cc of old ammonium polysulphide to this mixture, a yellow color is produced which immediately changes to white

#### POWDERED DESICCATED CORPUS LUTEUM

A yellow- to buff-colored amorphous powder with a characteristic, malt-like odor and a saline taste. It is partly soluble in water, alcohol, petroleic ether and ether. The color varies with the stage of pregnancy of the animal and with its age

The histological features of this product are as follows

Numerous hypertrophied yellowish lutein cells occurring singly or in small groups or irregular masses the lutein cells polyhedral ovoid oblong to irregularly elongated with a rounded central nucleus staining deep blue and cytoplasm staining purple with Delafield's hematoxylin many of these cells containing fat globules and lutein granules which take a black color with 0.5% osmic acid the lutein cells and granules staining greenish to greenish blue in 10% sulphuric acid, between various lutein cells in a clump occur connective tissue septa which are colored deep red with acid fuchsin and bluish with Mallory's stain occasional capillaries of cylindrical shape sometimes branched hyaline and showing black outlines in 1% silver nitrate solution occasional fragments of large blood vessels whose severed ends exhibit a serrate or crenate endothelium very few non-medullated nerve fibres, the axon colored mauve with eosin and hematoxylin the fibrillæ clearly seen in phosphotungstic acid and Mallory's stain, a few spindle shaped smooth muscle fibres with central nucleus colored deep blue with hematoxylin, a number of amyloid bodies colored purple to violet with iodine water, a faint yellow colorless crystalline substance

Grateful acknowledgment is made to the Wilson Laboratories and to Armour & Co for the glandular products used in this research

## NOTES ON THE WATER OF CRYSTALLIZATION OF QUININE SULPHATE

BY GEORGE DINTON BLAIR AND CHESTER E. SZALKOWSKI<sup>3</sup>

## INTRODUCTION

According to U S P X, quinine sulphate contains "7 or 8 H<sub>2</sub>O," and "effloresces rapidly when exposed to dry air or when heated to 50° C, losing all but two molecules of its water of crystallization and becoming lusterless." Among the "Tests for purity," we read "Quinine sulphate loses not more than 16.2 per cent when dried to constant weight at 100° C (drying)."†

Inquiry among pharmacists developed the fact that the U S P description, rubric and directions for storage in well closed containers were not regarded as of serious moment. As a matter of fact the instability of the water of crystallization is seldom mentioned in pharmaceutical literature. Cownley<sup>4</sup> says that while it is generally stated that anhydrous quinine sulphate is only obtained at temperatures exceeding 110° C, his carefully controlled experiments show that the salt readily became anhydrous at 100° C, and that when freely exposed to the air in the anhydrous state it rapidly absorbs water to become a dihydrate. The freshly crystallized salt contains 7 to 8 molecules of water, and when exposed to the air it rapidly effloresces to the dihydrate.

H B Parsons<sup>5</sup> reported the water of crystallization of 1015 samples of quinine sulphate as determined by him. One Gm. of each was dried in the water oven for three hours with the following results:

Brand	No. Sample	Average Percentage Moisture
American	16	13.72
American	184	12.61
German	12	12.32
German	634	14.19
Italian	169	14.36

Each sample reported represented 100 ounces from a previously unopened can. The differences above noted in the water of crystallization in the five brands reported were said to be tolerably constant and characteristic for each brand.

W A Spalding<sup>6</sup> weighed the contents of two quinine sulphate containers and repeated the weighings at intervals extending over twelve months for the first and eight months for the second. He observed a constant loss, 8 to 9 per cent for the first and 11.39 per cent for the second.

F A Thompson<sup>7</sup> found an average moisture content of 11.74 per cent in 183 samples, all of which responded to the other U S P tests for purity.

\* Scientific Section, A P H A Madison meeting 1933.

<sup>1</sup> Published by permission of the Chairman of the Committee of Revision, U S P XI.

<sup>2</sup> Assistant Director Mellon Institute of Industrial Research, Pittsburgh, Pa.

<sup>3</sup> Assistant in Research in Pure Chemistry, Mellon Institute.

<sup>4</sup> *Pharm J Trans* (Sept 2 1876) 189.

<sup>5</sup> *PROCEEDINGS A P H A*, 32 (1934) 457.

<sup>6</sup> *Ibid* 34 (1886) 605.

<sup>7</sup> *Ibid* 40 (1892) 267.

C E Sage<sup>1</sup> obtained two one-ounce bottles, one of which was opened and a little removed from time to time throughout two years, the other bottle kept sealed, and the two stored side by side. When finally assayed, the opened bottle contained 3.76 per cent of water while that in the sealed bottle contained 13.28 per cent. He also states that globules of water have been found condensed on the walls of tins containing quinine sulphate.

Reference has occasionally been made to original packages of quinine sulphate that were apparently under weight, or slack-filled. Comments have also been passed upon a change in appearance of the salt, whereby the long flaky crystals, so popular with those who gage their dose by apparent volume, have changed their form to short needles that have almost the appearance of a fine powder. Instances are also known where inspectors having prescriptions filled for subsequent analysis and possible prosecution have found said prescriptions as compounded to contain an unduly large amount of quinine, as much as 13 per cent in excess of the prescribed quantity being reported. The previously published articles suggest that these conditions are due to the ready loss of water of crystallization from quinine sulphate. We have been interested in determining the conditions and extent of this loss, and wish to report in part our studies to date.

#### EXPERIMENTAL

Through the courtesy of C Leonard O'Connell, of the Pittsburgh College of Pharmacy, and E Fullerton Cook, of the Philadelphia College of Pharmacy and Science, Samples 1 to 15 were obtained from drug stores in Pittsburgh and 16 to 26 from the various laboratories of the Philadelphia College of Pharmacy. Samples 27 and 28 came from recently purchased, unopened containers obtained by the Department of Research in Pure Chemistry at Mellon Institute. Samples of approximately 1 Gm were accurately weighed from tightly stoppered weighing bottles into tared porcelain dishes and dried in an electric oven at 100° C until the weights became constant. The dishes were removed to desiccators for cooling at the end of two hours, weighed and returned to the oven to be reheated for an other hour. No change in weights was observed as a result of the second drying.

TABLE I—WATER OF CRYSTALLIZATION IN COMMERCIAL QUININE SULPHATE

Sample No	Description	Per Cent Water	Molecules Water
1	From 1-oz container Very fine powder	4.39	1.9
2	Stock bottle Very fine, glistening crystalline powder	5.73	2.5
3	Stock container Fine silky needles	10.90	5.0
4	New container Fine silky needles	9.66	4.4
5	Stock bottle Very fine silky needles	8.34	3.7
6	Stock bottle Very fine, glistening powder	5.04	2.3
7	Stock bottle Very fine glistening powder	5.72	2.4
8	Glass stoppered bottle Very fine glistening needles	7.45	3.3
9	Freshly opened can Fine silky needles	12.27	5.8
10	Open stock container Fine glistening powder	5.09	2.4
11	Open stock container Fine glistening powder	4.69	2.0
12	Stock bottle Fine glistening powder	4.61	2.0
13	Stock container Fine glistening crystalline powder	6.56	2.9
14	Stock container Fine glistening powder	4.72	2.0

<sup>1</sup> *Pharm J* 119 (1927) 264

15	Opened stock container	Very fine, silky needles	5 94	2 6
16	Original unopened container	2 years old Fine silky needles	4 77	2 1
17	Original unopened container	2 years old Fine silky needles	4 94	2 0
18	Stock bottle	Old Fine glistening powder	4 57	1 9
19	Stock bottle	Old Fine glistening powder	4 64	2 0
20	Stock bottle	Very fine, silky needles	5 19	2 2
21	Stock bottle	Fine silky needles	5 22	2 3
22	Original container	Opened 1 month Very fine, silky needles	10 67	4 9
23	Original container	Unopened Fine silky needles	10 78	5 0
24	Original container, screw cap	Fine silky needles	9 65	4 4
25	Original container	Unopened Fine silky needles	5 78	2 5
26	Stock bottle	New Fine silky needles	7 35	3 2
27	New 50 oz can	Silky glistening crystals	12 20	5 7
28	Five oz metal can	Six months old Unopened Fine silky powder	4 63	2 0
27 B	Sample 27 in glass-stoppered bottle 2 weeks	Fine glistening crystals	11 60	5 4
28 B	Sample 28 in lightly stoppered bottle 2 weeks	Fine silky powder	4 66	2 0

Samples of anhydrous quinine sulphate and of quinine sulphate octahydrate were prepared from Sample 28. The anhydrous sample was prepared by drying to constant weight in an oven at 100° C. A portion of the anhydrous salt was dissolved in boiling distilled water and the solution allowed to cool slowly, when the salt crystallized. The mother liquor was separated from the crystals on a Buchner funnel, the wet crystals transferred to a porcelain dish and partially dried at about 80° C. The dish was then cooled for one hour in a desiccator over 1:1 sulphuric acid. A sample of about 1 Gm lost about 50 per cent in weight when dried at 100° C. The bulk of the crystals was returned to the oven at 80° C for thirty minutes, cooled, the moisture determined, and these operations repeated until 16.78 per cent of water remained, corresponding to approximately 8.4 molecules. The mass of crystals was thoroughly mixed before sampling for subsequent experiments. The anhydrous sample will be designated hereafter as "A" and the recrystallized sample as "R."

The stability of the water of crystallization and the tendency of the salt to absorb water were determined by exposing weighed portions of 27-B, 28-B, A and R to various humidities, at laboratory temperature, 23° to 25° C, until the weights of the various portions became constant. The test portions were exposed in flat dishes in desiccators containing concentrated sulphuric acid, 3:1 sulphuric acid, 2:1 sulphuric acid, 1:1 sulphuric acid, saturated solution of potassium acetate (20 per cent humidity), saturated solution of calcium chloride (30 per cent humidity), saturated solution of potassium carbonate (40 per cent humidity), and saturated solution of ammonium chloride (80 per cent humidity). All samples were exposed to their particular atmosphere for three hundred and thirty-six hours, or fourteen days, and were weighed daily. In no instance was there any pronounced change after the ninth day.

The percentage loss in weight of these samples is given in Table II. The figures in the first line for each sample indicate the percentage loss of weight at that particular humidity (gain in weight with Sample A). The second line of figures represents the result of the subsequent moisture determination, heating at 100° C for two hours. The third line of figures, for Samples R, 27-B and 28-B,

represents the total loss in weight of the sample, or, in other words, its water of crystallization

TABLE II—DETERMINATION OF WATER OF CRYSTALLIZATION OF QUININE SULPHATE AT VARIOUS HUMIDITIES

Sample	Original Water	Lab Hum %	H <sub>2</sub> SO <sub>4</sub> %	3 1 H SO <sub>4</sub> 2 1 %	H <sub>2</sub> SO <sub>4</sub> 1 1 %	20% Hum %	30% Hum %	40% Hum %	80% Hum %	
A	0	+ 4 95 - 4 97	+ 1 15 - 1 33	+ 4 15 - 4 00	+ 4 63 - 4 61	+ 4 68 - 4 76	+ 5 15 - 5 15	+ 5 18 - 5 22	+ 5 11 - 5 17	+ 5 10 - 5 22
R	16 78	-10 60 - 5 00 -15 60	-11 90 - 4 78 -16 68	-11 85 - 5 08 -16 93	-11 68 - 5 20 -16 88	-11 15 - 4 06 -16 11	-11 12 - 5 01 -16 13	-11 70 - 5 14 -15 84	-10 52 - 6 28 -16 80	- 3 38 -13 57 -16 88
27 B	11 60	- 6 70 - 5 12 -11 82	- 6 98 - 4 59 -11 57	- 6 88 - 4 88 -11 76	- 7 00 - 5 18 -12 18	- 6 50 - 4 51 -11 01	- 7 20 - 5 25 -12 45	- 7 05 - 5 10 -12 15	- 6 66 - 5 76 -12 42	- 2 68 - 9 15 -11 83
28 B	4 66	- 0 04 - 5 30 - 5 34	- 0 03 - 4 80 - 4 83	- 0 07 - 5 06 - 5 13	- 0 005 - 5 03 - 5 035	- 0 002 - 5 21 - 5 212	0 00 - 4 05 - 4 05	0 00 - 4 48 - 4 48	0 00 - 5 34 - 5 34	0 00 - 5 48 - 5 48

+ Indicates increase in weight  
- Indicates loss in weight

### CONCLUSIONS

Although some discrepancies appear in the preceding table, these particular determinations have not been repeated, as our purpose at this time has only been to determine the trend of the dehydration or hydration

Examination of the data in Tables I and II will indicate the tendency of this salt to form a stable dihydrate. The per cent of water in the dihydrate is 4.60, in the heptahydrate 14.43, and in the octahydrate 16.16. This tendency is in agreement with the U. S. P. description, which states that when exposed to dry air or when heated to 50° C it loses all but two molecules of its water of crystallization.

The tendency of quinine sulphate U. S. P. to dehydrate is marked, and it behooves pharmacists to buy quinine sulphate only in small, tightly closed containers, to store them in a cool place, and to keep the packages tightly and imperviously stoppered between the occasions of their use.

Quinine sulphate of less than U. S. P. water content may be easily converted to the dihydrate by exposure to dry air or by heating at 50° C.

PITTSBURGH, PA  
September 19 1933

### THE DETECTION OF SMALL QUANTITIES OF CARBON MONOXIDE IN MEDICINAL OXYGEN \*

BY JACOB E. SCHMIDT AND JOHN C. KRANTZ, JR.

#### INTRODUCTION

The detection and quantitative determination of small quantities of carbon monoxide in air and blood have been the subject of much investigation during the last three decades. However, little attention has been centered on the detection

\* The expense of this investigation was defrayed in part by a grant from the Research Fund of the AMERICAN PHARMACEUTICAL ASSOCIATION—Scientific Section A. Ph. A., Madison meeting 1933.

of this dangerous impurity in medicinal oxygen. Owing to the fact that the principal source of medicinal oxygen is through the fractional distillation of liquefied air, the presence of small quantities of carbon monoxide is indeed a possibility.

The principal methods employed for the determination of carbon monoxide in air are the Orsat (1), Blood Colorimetric (2), Blood Spectroscopic (3), Blood Pyro-tannic Acid (4) and Teague's (5) Iodine Pentoxide Method. Those methods involving the use of blood are well established and simple in manipulation. However, the sensitiveness of these methods is materially reduced when the dispersion medium of the carbon monoxide is pure oxygen and not air as shown by the following considerations:

When equilibration is established between CO and O<sub>2</sub> in the presence of hemoglobin the factors controlling the amount of carbon monoxide hemoglobin formed are the partial pressures of the two gases and the respective affinity (*a*) of the gases for hemoglobin.

Therefore

$$\frac{\text{HbCO}}{\text{HbO}} = \frac{p_{\text{CO}} \times a_{\text{CO}}}{p_{\text{O}_2} \times a_{\text{O}}}$$

Prince (6) setting the affinity of O<sub>2</sub> for hemoglobin at unity found the affinity of CO for hemoglobin to be 300, then

$$\frac{\text{HbCO}}{\text{HbO}} = \frac{300 p_{\text{CO}}}{p_{\text{O}}}$$

With air  $p_{\text{O}_2} = 20.93$  per cent or 2093 parts per 10,000 but with oxygen the equation becomes

$$\frac{\text{HbCO}}{\text{HbO}} = \frac{300 p_{\text{CO}}}{10,000}$$

This indicates that the sensitivity of the test is reduced approximately fivefold when oxygen is the dispersion medium.

Teague's modification of the iodine pentoxide method as further modified by Martinek and Marti (7) was studied. The latter investigators were forced to use many scrubbing bottles to free the air from hydrocarbons and other contaminating substances from the exhausts of internal combustion engines. The present authors found it possible to obviate much of this scrubbing as these impurities do not occur in medicinal oxygen. In this manner the test was simplified for Pharmacopoeial purposes.

#### EXPERIMENTAL

The iodine pentoxide method depends upon the passing of the dry gas containing the carbon monoxide over purified iodine pentoxide heated to 150° C. The gas bubbles, then, through a potassium iodide solution containing starch T S. The iodine formed by the reduction of the iodine pentoxide is vaporized and passes into the potassium iodide solution.

The assembled apparatus is shown in the illustration.

A and B are made of glass tubing having an internal diameter of about 3 mm. They are filled to a height of about 5 cm. with iodine pentoxide which has been heated at 215° C. for 3 hours. Each tube is heated by the paraffin baths E and F which are kept constant throughout the test at a temperature of 145° to 155° C. by means of the heaters G and H. C and D are drying tubes filled with calcium chloride. I is a tube having a capacity of about 50 cc. and con-

taining about 25 cc of potassium iodide T S J and K are two way stop-cocks by means of which the gas to be tested may be made to pass through the tubes D B and I or through tube M N is a 25 cc beaker containing 10 cc of potassium iodide T S and 3 drops of starch T S

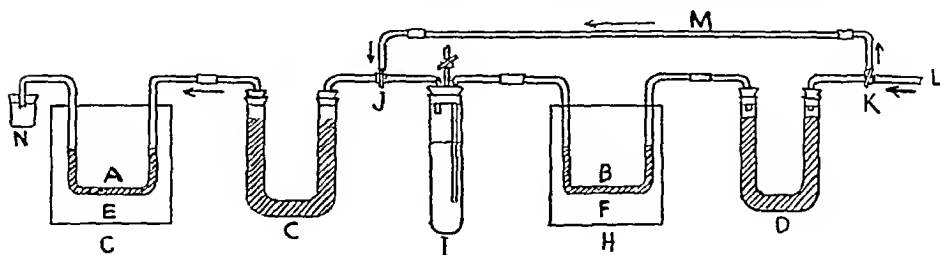


Fig 1

#### PRELIMINARY TREATMENT OF THE IODINE PENTOXIDE

When the apparatus is assembled first or when it has not been in use for some time, a preliminary treatment of the iodine pentoxide prior to proceeding with the test is often necessary in order to prevent its spontaneous decomposition with the liberation of iodine, which may lead to erroneous conclusions

Connect the oxygen supply with the inlet L, and adjust the stop-cocks J and K so as to include tube M Heat bath E to about  $215^{\circ}$  and bath F to about  $150^{\circ}$  and pass oxygen through the apparatus allowing it to bubble through the solution in N at the rate of about one bubble every two seconds Continue for about three hours Reduce the temperature of bath E to about  $150^{\circ}$  and pass 10 liters of oxygen in from 50 to 60 minutes allowing it to bubble into a fresh solution in N If the solution in N is colored blue or purple, raise the temperature of bath E to  $215^{\circ}$  and proceed as before If no coloration is produced in N, the test may be begun

#### THE TEST

Connect the oxygen supply with the inlet L, and adjust the stop-cocks J and K so as to exclude tube M Heat the paraffin baths to from  $145^{\circ}$  to  $155^{\circ}$  Pass the oxygen through the apparatus, allowing it to bubble through the solution in N at such a rate that 10 liters will pass in from 50 to 60 minutes At 10-liter intervals replace the solution in N, if it has acquired a blue or purple color Continue the passage of the gas until a 10-liter volume produces no coloration in a fresh portion of the solution in N Turn the stop-cocks so that the oxygen will pass through tube M, and, having poured a fresh solution into N, pass 5 liters of the gas (at the same rate) The solution in N is not colored blue or purple (carbon monoxide)

In this laboratory carbon monoxide was generated by the action of sulphuric acid on C P formic acid One-tenth-cc and 0.05-cc quantities, respectively, were collected over water in an especially designed capillary pipette The pipette containing the gas was transferred to a flask containing 5 liters of oxygen and agitated vigorously using about a liter of water to afford intimate mixing

#### RESULTS

- (a) Seven trials showed definite positive tests 1-50,000
- (b) Five trials showed definite positive tests 1-100,000



(c) Blank trials showed no liberation of iodine

The test was conducted using pure nitrogen as the dispersion medium instead of oxygen. This apparently did not augment the amount of iodine liberated

#### CONCLUSION

1 A simple test, requiring no gas free from carbon monoxide for scrubbing purposes, for the detection of carbon monoxide in medicinal oxygen has been devised

2 The sensitivity of the test is in the order of 1-100,000

The authors wish to express their indebtedness to the Linde Air Products Company of Buffalo for the supplying of oxygen and nitrogen, and also to their chief engineer, Dr. Leo I. Dana, for his criticism and advice during the course of this investigation

#### REFERENCES

- (1) W. W. Scott, Standard Methods of Chemical Analysis, D. Van Nostrand (1917) page 697
- (2) J. B. S. Haldane *J. Physiol.* 22 (1897) 139
- (3) Vogel's Spectroscopic Method in Technical Methods of Chemical Analysis "edited by George Lunge through Martinek and Marti
- (4) R. R. Sayers and W. P. Yant, Bureau of Mines, *Technical Bull.* 373
- (5) M. C. Teague *J. Ind. Eng. Chem.* 12 (1920), 964
- (6) A. L. Prince, "The Combination of Carbon Monoxide and Hemoglobin and Its Analytical Application" N. Y. State Bridge and Tunnel Comm., Sec. 9 App. 4 (1921), 188 through Sayers and Yant
- (7) M. J. Martinek and W. C. Marti, in: *J. Pub. Health* 19 (1929), 293

BUREAU OF CHEMISTRY  
STATE OF MARYLAND  
DEPARTMENT OF HEALTH

---

## LICORICE FERN AND WILD LICORICE AS SUBSTITUTES FOR LICORICE \*

BY LOUIS FISCHER AND E. V. LYNN

A preliminary study reported by one of us three years ago (1) indicated the possibility of using the rhizomes of licorice fern, *Polypodium vulgare L. var occidentale* Hook, in place of the official licorice. We have now completed that study and find increasing evidence for this substitution.

In the meantime attention was called to the common occurrence of wild licorice, *Glycyrrhiza lepidota* (Nutt.) Pursh. Apparently as an outcome of suggestions made at the annual convention of this Association in 1887, McCullough (2) reported an examination of the rhizomes. He found 8.53 per cent of ammoniated glycyrrhizin and 6.39 per cent of the crude acid, which differed considerably in taste from the compound as obtained from licorice.

From the published citations, one would conclude that the rhizomes are similar to those of licorice. Furthermore, we learn that they have been used as a

---

\* Scientific Section, A. Ph. A., Madison meeting 1933

tonic by the Pah Ute Indians (3) and that the whites have chewed them in place of tobacco. We are quite puzzled by this situation because our material was bitterish and rather salty, but not sweet and with little resemblance to licorice.

The specimens used by us were identified by Prof. George Neville Jones of the University of Washington. The licorice fern was collected in and near Seattle, the wild licorice near The Dalles, Oregon, in June 1929. The materials were well cleaned, thoroughly dried in air at about 35° C. and ground to fine powders. Proximate analyses gave the following results in percentage, all except the loss of volatile matter being based on the dried sample. The methods used are described in the previous paper (1).

TABLE I

	Licorice Fern Rhizomes	Leaves	Wild Licorice Rhizomes.
Loss in air	75.63	74.38	58.97
Loss at 110° C	79.17	77.10	59.94
Total ash	2.69	6.15	5.18
Acid-insoluble ash	0.27	0.08	0.55
Soluble in ether	7.32		1.67
Soluble in chloroform	7.71		1.75
Soluble in ethyl acetate	15.59		3.66
Soluble in alcohol	35.81		14.28
Soluble in water	41.19		27.88
Selective extraction			
Petroleum ether total	6.07	3.06	1.41
Non-volatile	6.04	2.88	1.13
Ether total	2.59	3.61	0.94
Non volatile	2.18	3.48	0.76
Chloroform	1.08	1.69	0.46
Ethyl acetate	2.27	4.16	1.49
Alcohol	21.36	15.57	13.14
Reducing sugars	4.22	17.00	2.29
Sucrose	15.51	0.66	3.64
Starch (Hooker)	6.29		3.49
Pentosans (Spoehr)	6.22		12.19
Pentosans (A. O. A. C.)	7.75		14.63
Nitrogen $\times 6.25$	9.00		
Tannin	2.46		None
Alkaloid	None	None	

The amounts of sugars, starch and tannin are subject to considerable variation with the seasons as would be expected. Sucrose was isolated from all three materials and identified by melting point, specific rotation and ultimate analysis. Found carbon 42.03, hydrogen 6.41, calculated 42.08 and 6.48 per cent.

The leaves of licorice fern were found to contain starch-splitting enzymes using a method previously described for the rhizomes. There are also present in both materials enzymes which will split beta-glucosides.

#### GLYCYRRHIZIN

In the present investigation great doubts were early presented on previous presumptions that glycyrrhizin is contained in the rhizomes of either plant. For estimation of its amount there were used the method (I) of Housemann (4) and one (II) which is a modification of several which are found in the literature. The latter is as follows:

fifty grams of sample were macerated for six hours with diluted ammonia (1:19) and then percolated with additional water until 500 cc. of liquid were obtained. Exactly half of this was treated with excess of dilute sulphuric acid and allowed to stand over night in an ice box. The filtered precipitate was well washed with ice-water, redissolved in the diluted ammonia and again precipitated with acid. After repeating this process once more, the final ammoniacal solution was evaporated and heated to constant weight.

	I	II	
Licorice	6.71	11.43	Sweet and light brown
Wild licorice	7.48	9.72	Slightly bitter and light brown
Licorice fern	1.11	9.34	Tasteless and red-brown

The most striking feature was the difference in taste of the residue. Assuming, as seems unavoidable, that all of the glycyrrhizin is present as ammonium salt, the conclusion is that in licorice alone is there more than a mere trace.

The increased amounts in Method II apparently arise in the absence of preliminary extraction by strong alcohol. In order to confirm this, the process was repeated using such a preparatory extraction as outlined by Housemann (4). The results were: Licorice, 7.89; wild licorice, 8.39; licorice fern, 1.87.

It may be concluded, therefore, that neither of the last two contains more than a trace of glycyrrhizin. The former gives as much residue as licorice, but this is without sweet taste, and the much smaller amount from licorice fern is also without sweetness.

As further confirmation, all three were submitted to the process for purification by Tschurch and Cederberg (5). Licorice yielded the characteristic sweet acid which was further purified by crystallization from hot acetic acid. The others, however, gave no crystalline material at all and nothing which corresponded to glycyrrhizic acid. It is interesting to note that the materials obtained from wild licorice were quite bitter throughout.

The absence of glycyrrhizin from these plants again emphasizes the fallacy of drawing conclusions after the usual quantitative methods, and the reports of finding this substance in various plants is usually based upon no other evidence. Because such methods of reasoning proved erroneous here, one could justifiably assume that there must be serious doubts in all other cases, except where the substance was actually isolated and analyzed, as was done by Tschurch for *Periandra dulcis* and for monesia bark.

#### LEAVES OF LICORICE FERN

A large quantity of the leaves was exhausted by hot alcohol which, upon cooling, gave 0.86 per cent of a flocculent yellowish precipitate. The solvent was mostly removed from the alcoholic solution by distillation under reduced pressure and the residue was submitted to distillation by steam.

**Benzoic Acid**—The distillate, which was acid in reaction, was completely extracted with ether. After drying and removing the solvent by spontaneous evaporation, there was left a crystalline residue which, after purification, melted at 120° C. Solubility and other properties accorded with those of benzoic acid and this was confirmed by converting to ethyl benzoate. The remainder of the distillate still contained acid corresponding to 0.05 per cent of the drug, as determined by titration and calculated for acetic acid. Incidentally benzoic acid was also found in the distillate from wild licorice rhizomes.

*Salicylic Acid*—The thick, green residue from distillation by steam was extracted with ether in which only a portion dissolved. From the ether solution 10 per cent solution of ammonium carbonate withdrew more benzoic acid and some salicylic acid, which gave a violet color with ferric chloride and was also converted to methyl salicylate.

*Phytosterol*—The residual solution in ether was evaporated to dryness, leaving a black oil. From this hot dilute alcohol extracted a small amount of a crystalline solid, melting point  $132-133^{\circ}\text{C}$ , which gave a white precipitate with digitonin decomposing at  $211-212^{\circ}\text{C}$ . It also responded to the various tests for phytosterol (Schiff, Moleschatt, Salkowski, Burchardt-Liebermann, ferric chloride) and was not saponifiable.

The aqueous solution left upon distillation with steam was found to contain a nitrogenous base and the sugars. Neither this nor the resins were examined further.

*Substance Melting at  $74^{\circ}\text{C}$* —The flocculent material which separated from the original alcoholic solution was purified by crystallization from hot alcohol containing charcoal. It was then perfectly white and melted at  $73-74^{\circ}\text{C}$ , dissolved easily in benzene but only partly so in other solvents and not at all in water or cold alcohol. The substance was not affected by boiling dilute acids or alkalis and did not react with semicarbazide or with benzoyl chloride. Combustion of several samples gave 80.65 per cent of carbon and 12.80 per cent of hydrogen, leaving 6.55 per cent of oxygen. Evidently it cannot be a hydrocarbon, although its inactivity to reagents might so indicate. The small amount of material available prevented any further investigation of this interesting substance.

#### RHIZOMES OF LICORICE FERN

During the preliminary extractions it was noted that a substance separated from ethyl acetate on cooling. Later it was found that a preliminary treatment of the rhizomes with chloroform to remove oil and some resin and subsequent extraction with hot ethyl acetate resulted in a white product. The total amount was about 9 per cent of the dry rhizome.

It was sweet and somewhat bitter, soluble in hot water to give a slightly turbid or clear solution on cooling, also in alcohol and fairly so in acetone, but insoluble in other usual solvents. The melting point varied with each batch, somewhere between  $90^{\circ}$  and  $135^{\circ}\text{C}$ , always with more or less decomposition. Calculated as reducing sugar, the Munson-Walker method showed 15 per cent before hydrolysis and about 45 per cent after. Sucrose could be separated and identified by its melting point, by the specific rotation of  $+67.2^{\circ}$ , and by an ultimate analysis.

An alcoholic solution of the materials was precipitated by ether and the product was dissolved in hot water. Neutral and basic lead acetate were added in excess and the resulting precipitate was suspended in water and treated with hydrogen sulphide. Evaporation of the filtrate gave a small quantity of brownish residue which was free from sugars and possessed a characteristic taste. That it was mixture was concluded from the melting point, there was some darkening at  $110^{\circ}\text{C}$  but no complete melting below  $140^{\circ}\text{C}$ . Judging from various experiments, it was apparent that the original substance from ethyl acetate contained, in addi-

tion to sugars, a mixture of compounds in small amounts which are, with the sweetness, responsible for the taste and give the resemblance to licorice. The amount present in the rhizomes is too small to be of any importance except to impart this taste.

*Polydin*.—An alcoholic extract of the rhizomes was concentrated under reduced pressure to a small volume and precipitated by adding eight times as much ether. After standing for several days, the clear supernatant liquor was decanted and evaporated to a small volume. Crystallization set in after about a week to give ultimately 0.75 per cent. The substance obtained was soluble in alcohol, in acetone, in hot water or in spirit of ether, but only partially in hot ethyl acetate and insoluble in chloroform or ether. Purified by repeated recrystallization from a mixture of acetone and water, it was finally obtained in the form of rosettes, melting sharply at 188–189° C. It had no effect on Fehling's solution until after hydrolysis by hydrochloric acid, when it gave an abundant reduction. The addition of ferric chloride to an aqueous solution gave a greenish blue color which could not be obtained in the presence of much acid. Phosphotungstic acid gave to an alkaline solution a blue color. Both of these reactions are characteristic of arbutin which was also indicated by the melting point.

A small portion was suspended in water under an equal volume of ether and hydrochloric acid was added drop by drop over a period of two days, when the mixture was clear. The ethereal solution was separated, dried with anhydrous sodium sulphate and evaporated, leaving a white substance which melted at 167° C. Physical comparison showed that this was not hydroquinone, melting at 169° C., and no quinone could be obtained upon oxidation. From the aqueous solution there was obtained apparently a mixture of osazones, one of which was similar to that of lactose. Hydrolysis of the glucoside, therefore, resulted in a compound melting at 167° C. and one or more sugars.

Ultimate analysis of highly purified samples of the glucoside gave as average carbon 56.32, hydrogen 5.42, per cent. Since it seems to correspond with none so far recorded in the literature, the name polydin is suggested for it. The available material was too small to permit further examination and its minor relation to the problem in question did not appear to warrant additional work.

One experiment was made, however, to see if polydin is potent. A white rat was fed 0.15 Gm. representing 0.8 Gm. per Kg. of body weight. Although this corresponds to approximately two ounces for an average adult person, yet there was no apparent effect on the rat.

*Comparative Galenicals*.—In the earlier report (1) a series of preparations was made which compared rather unfavorably in taste with those from licorice. In view of our discovery that a previous extraction with chloroform will remove at least a part of the bitter taste, we have repeated these preparations on material which had been so treated. The taste in general was notably improved, the bitterness was not as noticeable and the preparations possessed a smoother and more palatable taste, but they were still somewhat inferior. Addition of certain aromatics, however, gave entirely suitable products and we have no doubt that satisfactory formulas could readily be devised.

*Cultivation*.—Since the winter of 1929 experiments have been made in growing the fern. Specimens were collected from several places, leaving the plant wholly

intact and with a portion of the moss upon which it grew. These were planted in a frame containing rich, well-fertilized soil and the frame was covered with small panels about 15 inches wide and spaced the same distance apart to allow a partially shaded condition. One-half of the frame was then covered with burlap to keep any direct sunshine from the growth underneath.

The plants began to grow immediately but very slowly. Over the period of four years the leaf-growth has been very heavy but the rhizomes are short and compact and do not compare in length with those which have been observed in a natural habitat. The leaves of the plants covered with burlap have been greater in number, more fully developed and of a rich green color, while the leaves not so covered but in similar soil have been shorter, not as thick, and pale green.

In other experiments portions of the rhizome, about 2 to 2.5 inches in length and each containing a growing tip, were planted under various conditions. The first group was planted in soil obtained from their natural surroundings, the second in moss surrounded with rich, loamy soil, the third in the loamy soil originally in the cold frame. After one year the rhizomes were found to have grown from one to two inches, but in none was there a great amount of leaf development.

After the four years of experience in these studies, we are convinced that commercial production would be entirely practicable. It is true that growth is slow under any of the conditions used and that duplication of natural environment would not be feasible. Nevertheless, cultivation could be accomplished under almost any circumstances and determination of the best conditions should be a simple matter. The licorice fern can undoubtedly be grown and harvested at a price far under that of Russian or Spanish licorice. We urge further study of this interesting problem.

#### SUMMARY

The rhizomes of wild licorice contain benzoic acid and sucrose but no glycyrrhizin.

The leaves of licorice fern contain sucrose, benzoic and salicylic acids, a phytosterol and an unidentified substance melting at 74° C.

The rhizomes contain no glycyrrhizin in spite of the characteristic, licorice-like taste which was found due to sugars, including sucrose, plus a small amount of an unidentified substance. They contain also a glucoside, which is named polydin, but no alkaloids.

The rhizomes can be used satisfactorily in place of licorice in medicine, especially if previously extracted with chloroform. Experiments in cultivation have indicated that commercial production to economical advantage is very possible.

#### REFERENCES

- (1) Fischer and Goodrich, *THIS JOURNAL* 19 (1930), 1063
- (2) McCullough, *Am J Pharm* 62 (1890) 388
- (3) Palmer, *Ibid*, 50 (1878) 591
- (4) Housemann, *Ibid* 93 (1921) 478
- (5) Tschirch and Cederberg *Arch Pharm* 245 (1907) 97

## THE PIGEON AS A HEMATOPOIETIC TEST ANIMAL \*

BY WM A PLEABODY<sup>1</sup> AND R C NEALE

The need of a dependable laboratory assay method for the antipernicious anemia principle has been obvious for some time. Vaughan, Muller and Zetzel (1) in 1930 described the use of grain-fed pigeons as test subjects. Orally or parenterally, effective liver extracts gave marked increase in pigeon reticulocyte percentages without significant rise in red blood cells or hemoglobin. Normal saline, histamine, vitamins B<sub>1</sub> and B<sub>2</sub>, human gastric juice and casein gave essentially negative reticulocyte responses. Beef steak gave results similar to those from liver, while leucine produced suggestive effects although known to be negative clinically. Recently Edmunds, Brueckner and Fritzell (2, 3) reported encouraging results with this method.

The present study was undertaken to learn more about the practicability of the test and its specificity for the principle in question. The effects of injecting normal saline, leucine, histidine, tryptophane, ash of liver extract and several intramuscular liver preparations were chosen for investigation. Histidine and tryptophane were included because of the claim of Fontes and Thivolle (4) that these amino acids together are the essential factors lacking in primary anemia. Determinations of erythrocyte and hemoglobin levels were not contemplated, but they were followed in a number of experiments after it was noticed that long confinement on the rather restricted diet apparently produced subnormal blood conditions.

## METHODS

*General*—Birds were taken without reference to sex or breed and caged singly or in pairs. Diet was restricted throughout to the mixed grain and water. In the earlier experiments, weights and reticulocyte percentages were determined at intervals during the fore periods as well as the experimental periods. Later, weighings were made only for the purpose of comparing the dosages per unit of body weight. Most injections were made after the initially high (around 20%) reticulocyte levels had subsided to 11–15% and were fairly constant or only slowly changing. The counts were made at one to two day intervals just preceding and throughout the injection periods, but at longer intervals after recession of the reticulocyte curves from their peaks. When red cell and hemoglobin were determined, samples were taken shortly before injection, at or near the peak of the reticulocyte rise and again about a week later.

*Blood Collection and Staining*—Blood samples were taken at about the same hour in the morning always before injections. One or two drops of blood from a wing vein were mixed in small glass cups with about twice that volume of a solution of 0.85% NaCl containing about 1% potassium ovalate. Smears, two for each sample, were spread by the slide method, with a spreading slide having smoothly ground beveled edges. The present procedure was developed when it was found that the use of brilliant cresyl blue, before or after drying of the smear, with or without alcohol fixation or the use of Wright's stain, variously caused the pigeon erythrocytes to hemolyze, fragment or stain too lightly. The presence of a nucleus in these cells obviated the necessity of using a counter stain when it was found that methylene blue (Löffler's, in 0.85% NaCl) satisfactorily stains both nucleus and reticulum. The air dried smears simply were suspended in a jar of this stain for three minutes or so, removed washed briefly in running water, and again air dried. With this relatively simple procedure, a very high proportion of excellent preparations resulted. These stains tended to fade when covered with oil for several hours. For the earlier experiments, the reported values for reticulocyte percentage are based upon

\* Scientific Section, A. P. H. A., Madison meeting, 1933.

<sup>1</sup> Valentine's Meat-Juice Company, Medical College of Virginia, Richmond.

average counts made by two individuals, later, by one and the same individual. In either case, at least 1000 cells were counted for each sample, and 2000–4000 cells when the distribution was irregular. Except early in the first few experiments all but the most doubtful reticulated cells were counted as reticulocytes.

Blood for red counts and hemoglobin were collected from the same veins in the usual pipettes. The instruments (improved Neubauer, Sahli) were not specially standardized, but as the same set of each apparatus was used throughout, and by the same individuals, the figures reported for either determination are strictly comparable.

*Preparations Dosages, etc.*—The lots of intramuscular liver extract used (excepting sample X," 1 cc = 33.3 Gm. liver) were of approximately the same liver equivalence (1 cc = 5 Gm. of liver extracted). Phenol or tricresol 0.05% was used as preservative. Dosages were chosen to provide about 156 mg. of total solids, as determined before neutralization and sterilization. This required 0.70–0.75 cc. of extract in all. This amount, whether given in 1, 3 or 6 injections hereinafter is referred to as a "single dose," half the amount as a "half dose," etc. Organic solids, approximated by deducting ash from total solids, amounted to 147 mg. per cc. in one representative lot.

Saline 0.85% for injection contained phenol 0.05%.

The amino acid dosages were about equivalent to the organic solids contained in the single dose of liver extract. Histidine-HCl and tryptophane were about equal by weight in Experiment 9b, and 2:1 molecularly, respectively, in Experiments 5a, 10b and 11c.

Ash was dissolved in HCl, filtered, neutralized and made to double the volume of the extract. Ashed, ash obtained from the single dose of extract was given in each of the two tests.

Only the liver extracts were Berkfeld filtered, other solutions were heat treated excepting those of histidine tryptophane designated later. Injections were intramuscular or subcutaneous into the breast excepting the 3 saline tests made on leg muscles.

All birds which gave negative responses after administration of inert substances were shown to be responsive to liver extract at some time or other.

## RESULTS AND DISCUSSION

*Control Periods*—The reticulocyte percentages (hereinafter abbreviated to R. P.) for six of the first seven birds fell from 15–22 per cent down to 8–10 per cent (in one case, to 5 per cent), after about 25 days of confinement. Instead of leveling off at the minimum as expected, many of the curves climbed again before coming to a fairly constant level in the range 11–13 per cent. For brevity these parts of the curves, as well as most of the negative curves for other substances, are omitted from the figures and tables.

The first saline control experiment unfortunately was begun during the unexpected rise following the first minimum, and resulted in an apparent boost from 13% to 19%. The same bird later responded to a single dose of liver extract, one injection, by a rise from 13% to over 21%. Three other initial saline controls were entirely negative.

*Effect of Liver Extract*—Liver extract injections produced significant reticulocyte responses in all instances. While the double dose (Experiment 1a, Table I) gave only slightly greater absolute rise in R. P. than did the average single dose (2a–11a), the latter averaged about twice as effective as the half doses (7d, 10d). The relative rises in R. P. vary much more than the absolute increases, since in general the greater responses occurred with the lower starting levels of R. P. Evaluation of the absolute rise in R. P. per unit of dosage per kilo of body weight should give better comparative figures ("Response Index"). The greatest variation of this index occurs between Experiments 6b and 4c—about 61 per cent, based on the lower value (2.3). It is felt that the variations between some of the other



experiments would have been less if only those birds weighing 300–400 Gm had been used, since the smaller birds, as compared with the larger, usually did not seem to respond (to the same amount of extract) quite in inverse proportion to the body weights. Perhaps the single dose was above the optimum dose for these smaller pigeons. In Experiments 2a, 4a and 4c, delayed secondary peaks in the R P curves occurred. The higher points appear to be nearer the correct values, as compared with the average results. Apparently, the double rises are more likely to occur after multiple injections. In 4c (1 injection) the difference between the two peaks, both in time and in R P, was much less than after 6 injections in 2a and 4a. Obviously, a considerable number of tests would have to be made to obtain a quantitative assay.

In a number of the earlier experiments, small hematomas formed around the wing veins, but probably caused no stimulation of hematopoiesis, since some of them accompanied the level or descending curves after salt or other inert sub-

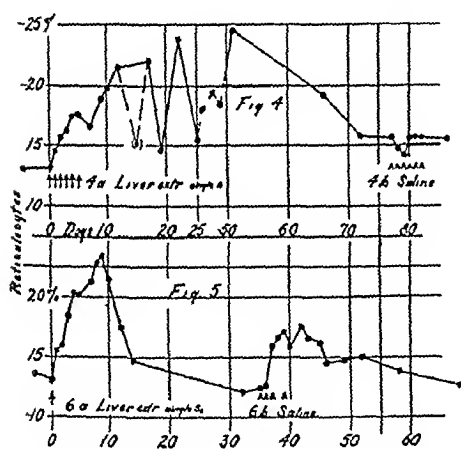


Fig 4 and Fig 5—Effect of intramuscular liver extract followed by saline, on pigeon reticulocyte percentages

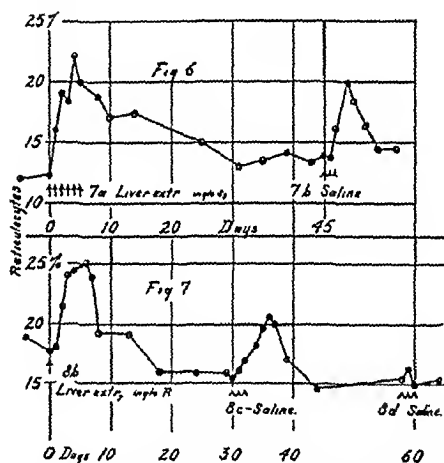


Fig 6 and Fig 7—Effect of intramuscular liver extract, followed by saline, on pigeon reticulocyte percentages

stances. Significant hemorrhage occurred in only one instance, a salt experiment to be discussed later. All birds treated with liver extracts appeared to be in good general health throughout the experiments.

Red cell and hemoglobin determinations were undertaken after the diet and the prolonged confinement appeared to produce blood paler in color, with increased erythrocyte size, while liver extract treatment seemed to deepen the color. The results (Table II and Fig 8) indicate probable increases in hemoglobin and notably higher red cell counts after the single doses. It was necessary to dilute the third sample 1:1 in Experiment 4c in order to obtain a hemoglobin reading on the (Newcomer) instrument scale, but the values have been omitted because of probable error in readings for the first two samples. In Experiment 11a the r b c increased one million even with a high starting level.

Except, possibly, for earlier response, the results agree qualitatively with those of Edmunds, Brueckner and Fritzell, but close comparisons are difficult

because of the differences in dosage and starting levels. As compared with the results of Vaughan *et al.*, for equivalent doses of similar extracts, the reticulocyte responses are of about the same order. Their findings that red cell counts were not appreciably influenced, very likely may be explained on the basis that their last samples were taken the day after the last injection, *i. e.*, the seventh day after the first injection. In Table II it appears that the maximum values for red cells are reached somewhat later, and that the increase at 7 days (Experiment 4c) may be slight. The fact that our doses were given in one injection, or in three at the most, that unknown hereditary or environmental factors may have operated, or that there may have been actual differences in the extracts used, must also be considered. That the extracts employed in the present work produced no weight increase beyond the normal fluctuation possibly indicates a difference in composition. Over long periods, the diet and inactivity maintained or increased the weight of all birds used.

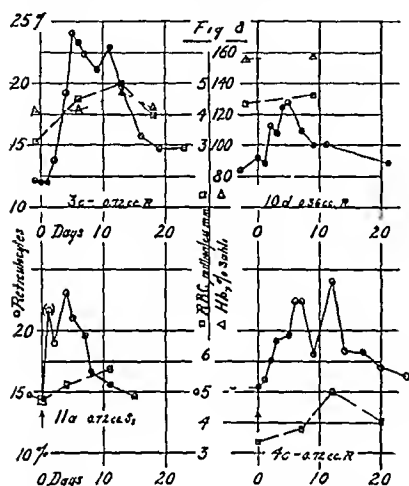


Fig 8—Effect of liver extract intramuscularly on reticulocytes, red blood cells and hemoglobin in pigeons

salt was then made in the leg muscles after liver in the breast with a tremendous rise resulting. This bird however had bled heavily after blood sampling on the day before the first salt injection. A second such experiment, soon after a half dose of extract, brought a 3.8% increase, practically to the peak after liver, though from a higher starting level. Salt was then injected into the leg muscle of a pigeon which had received no previous liver treatment. No R P rise resulted. Previous liver administration apparently is necessary if the salt effect is to be elicited by injection either into the leg or the breast. These results render the explanation of the salt-after-liver effect still more obscure, since it scarcely is conceivable that the injection into the leg of as little as 0.72 cc of physiological saline, divided into 2 or 3 doses, could directly cause liberation of any active principle stored at some remote site.

*Asb of Liver Extract, Leucine*—Two experiments with each of these preparations showed no reticulocyte response.

*Histidine and Tryptophane*—The first trial with the combined amino acids (9b), in which about 114 mg were given in 4 injections, brought a prompt but transient R P rise of 6.8%. The peak was reached before the third injection and the curve had descended below the starting level two days after the last injection. This bird undoubtedly was sick, as shown by ruffled feathers and marked diarrhea during and for at least a month after the injection period, but whether the condition preceded the first injection was not noticed. In the next test (5a), 100 mg produced

*Salt Injections after Liver*—When the R P of the first pigeon injected with liver extract had fallen to a level, at 15–16%, saline injections into the breast were begun. The day after the second injection, the R P had risen to 22.3%, when the bird was discarded. It was then decided to follow this effect in other birds (Fig 4 to 7, Fig 1 to 3 have been omitted to save space). Thus it was possible to show that, for the dosages used, the magnitude of the effect gradually and rather evenly decreased until it became negligible at 70–77 days after the last injection of liver. The only satisfactory explanation available was that the saline “flushed out” from the site of the injections a quantity of the liver substance which otherwise but gradually would become absorbed. In 2 later tests, brief massage of the injected areas on several different days produced no response, although distilled water gave a 2.5% rise in one. Injection of

a 3.5% rise, lasting somewhat longer and without pathological symptoms. This experiment was the only one of this series in which red cell and hemoglobin determinations were made (Table II). Although there was an apparent slight increase in hemoglobin, the red cell count continued to decrease. Each of these solutions had been made definitely alkaline to litmus by addition of NaOH before sterilization in the boiling water bath upon which, particularly in the first, a yellow discoloration resulted. Because of this and in view of the known lability of tryptophane, it seemed possible that decomposition products might have been responsible for the observed effects. For the next experiment (10b) with 100 mg of the combined acids Na CO<sub>3</sub> was used for neutralization and the solution was not heated. The results were definitely negative, as also in a fourth trial (11c) in which were used 112 mg from a new source of supply, neutralized with NaOH and heat treated. Two more experiments respectively using histidine HCl (78 mg), and tryptophane (75 mg) separately, made slightly alkaline with NaHCO<sub>3</sub> and heated, also gave no increase in R. P. although the tryptophane solution was fairly yellow in color.

The positive results in Experiment 9b may as reasonably be attributed to sickness of the bird as to injections of the amino acids since in two instances subsequently R. P. increases were found to accompany diarrhea when nothing had been injected. Whether to attribute the moderate R. P. response in 5a to histidine-tryptophane to decomposition products thereof, or to unknown causes remains debatable. The existence of difference in degree of decomposition as compared with the subsequent negative experiments is a possibility. Whatever the role of tryptophane and histidine in pernicious anemia it seems justifiable to conclude that they as free amino acids are not the substances in liver extract effective in the pigeon. Although histidine was found present by qualitative test only combined tryptophane was demonstrated, and it is extremely unlikely that more than a small fraction of the organic solids of the extracts is composed of these amino acids. The pigeon active crystalline material isolated from liver extract and used in Experiment 5b (Table II) gave negative tests for histidine, tryptophane and tyrosine. Further details are omitted since the crystals later were found to be impure and too little was available for a complete study.

*Copper*—Although ash was ineffective the fact that liver extract produced much more increase in erythrocyte count than in hemoglobin indicated that the possible effect of copper should be checked separately. Each of 3 birds was given 0.01 mg Cu (0.1 cc of CuSO<sub>4</sub>) in single injections. This amount of copper was practically twice that found by analysis in the single dose of preparation T. Two of the birds showed no response the third an R. P. rise of 3.5 per cent, about equal to the result after a half dose of liver extract. Thus the presence of traces of copper appears to account for little more than a quarter if any, of the response noted after liver extract injection.

*Clinical Comparison*—Unfortunately, circumstances have prevented extensive clinical testing of the extracts used in the present work. Preparation "R" in four cases of tropical sprue exhibited low potency as compared with a well-known commercial product. Another sample failed to provide maintenance in a case of pernicious anemia, although equal volume dosages of commercial extract "X" proved adequate.<sup>1</sup> Since equal volumes of "R" and "X" produced about the same response in the pigeon, the assumption that the pigeon test is specific for the anti-pernicious anemia principle may be unjustified. Also, Edmunds, *et al* observed destruction of pigeon potency upon heating an extract at 75° for 15 minutes, yet clinically potent preparations often have been sterilized by heat treatment.

It should be noted that the dose necessary to give significant reticulocyte increase in the "normal" pigeon is tremendously large compared (on the basis of body weight) with the clinically therapeutic dose. Thus, 0.36 cc of "X" in the

<sup>1</sup> We are indebted to Dr. Rafael Molina, University of Porto Rico, San Juan, P. R., and Dr. Wm. B. Porter, Medical College of Virginia, Richmond for the reports on sprue and pernicious anemia, respectively.

400-Gm pigeon (8f) is equivalent to 54 cc in a 60-kilo patient Yet the pigeon reticulocyte increase was only 3.6 per cent, 27 per cent over the starting level, and only about twice as great as a possible normal fluctuation

*General Recommendations for Performance of the Pigeon Test*—To attain more uniform results, certain recommendations seem warranted Birds weighing 300–400 Gm are preferable Those which exhibit diarrhea should be discarded To guard against spontaneous reticulocyte rises which occasionally occur, two or three blood samples had best be examined at close intervals before and including the day of injection The flow of blood should be stopped promptly after sampling (this usually offers no difficulty) The dosage for active extracts should be chosen to give an absolute increase in reticulocyte percentage of at least 8–12 per cent when the optimum initial level of 11–13 per cent is used Single injections are preferred if the resultant volume is

TABLE I—RETICULOCYTE RESPONSES IN GRAIN FED PIGEONS AFTER LIVER EXTRACT INTRA MUSCULARLY

Pigeon	Experiment	Total Dose Cc	No Injs	Ret Span	Ret Abs	Rise % Rel	Wt at Inj Gm	Response Index <sup>1</sup>
1	1a	1.80Q	6	10.8–23.1	12.3	114	253	1.6–
2 <sup>3</sup>	2a	0.72R	6	11.9–20.3 } –25.1 }	8.4 13.2	71 111	211	1.8– or 2.8–
3	3a	0.75S <sub>1</sub>	6	11.0–22.3	11.3	103	264	3.0
	3c	0.72R	3	12.0–24.0	12.0	100	(280)	(3.4–)
4	4a	0.90Q	6	13.2–22.0 } –24.5 }	8.8 11.3	67 86	229	2.0 or 2.6
	4c	0.72R	1	15.4–22.4 } –24.1 }	7.0 8.7	45 56	260 est	(1.8) (2.3–)
	4d	0.72T	2	14.0–25.2	11.2	80	245	2.7
6	6b	0.75S <sub>2</sub>	1	13.1–23.4	10.3	79	360	3.7
7	7a	0.78S <sub>1</sub>	6	12.3–22.0	9.7	79	323	3.1
8	8b	0.72R	1	17.7–25.0	7.3	41	(400)	(2.9)
11	11a	0.72S <sub>2</sub>	1	14.4–23.1	8.7	60	(316)	(2.7)
7 <sup>4</sup>	7d	0.36R'	1	12.3–17.2	4.9	40	336	3.3
10	10d	0.36R'	1	14.0–18.5	4.5	32	379	3.3
6	6c	0.36X <sup>2</sup>	1	12.3–15.9	3.6	29	396	2.9
8	8f	0.36X <sup>2</sup>	1	12.7–16.1	3.4	27	400	2.7

<sup>1</sup> Response index =  $\frac{\text{Absolute rise in R } P}{\text{No. of "Single dosages" per Kg. of body weight}}$

<sup>2</sup> X = A commercial preparation

<sup>3</sup> Experiments 2a–11a "single doses" Bracketed figures indicate a second, delayed peak in reticulocyte curve Parentheses indicate figures are subject to some error because of failure to weigh birds at time of injection

<sup>4</sup> Experiments 7d–8f Half doses "

not too large as this saves time and labor and probably gives smoother curves Reticulocytes should be determined at one- to two day intervals until after the maximum appears to have been passed The same pigeon can be used for repeated tests if disappearance of the active substance is demonstrated by salt injection before each new experiment or if the time between tests is known to be ample from previous experience

#### CONCLUSIONS

Inorganic constituents (liver extract ash, copper), leucine and likely histidine and tryptophane have been eliminated as constituents of liver extract effective in increasing the reticulocyte percentage in the blood of grain-fed pigeons Liver extract injection also significantly increases the concentration of red blood cells

and probably the hemoglobin in such birds. While these results strengthen the assumption that the pigeon response is a measure of the substance or substances effective in pernicious anemia, limited clinical comparisons indicate that the pigeon

TABLE II — RED CELL AND HEMOGLOBIN RESPONSES

Experiment	Dose	Days after 1st Inj	Retic %	Red Cells Million Per Cu Mm	Hemoglobin Sabli %
3c	Single R, in 3 injs	0	12 1	3 12	122
		7	23 3 <sup>1</sup>	4 54	123
		14	19 7	5 00	135
4c	Single R 1 inj	0	15 4	3 40	
		7	22 4	3 81	Unchanged (?)
		12	24 1 <sup>2</sup>	5 02	Increased <sup>2</sup>
		20	17 0	4 08	
5a	Histidine tryptophane 100 mg in 2 injs	-3	15 8	3 84	83
		-1	15 6	3 74	
		1	16 0		
		3	16 8	3 14	
		7	19 3 <sup>4</sup>	3 39	90
		13	15 0	3 36 (10/31/32)	
5b	Crystals (L E) 44 mg 3 injs	0	14 8		
		9	19 2 <sup>5</sup>	4 91 (1/4/33)	
10d	Half R 1 inj	-2		4 37	156
		0	14 0 <sup>6</sup>		
		9	15 1	4 63	158
11a	Single S <sub>2</sub> , 1 inj	0	14 4	4 77	
		4	23 1 <sup>7</sup>	5 23	
		11	15 6	5 77	

Remarks <sup>1</sup> Max 24 0%, 6th day <sup>2</sup> Max <sup>3</sup> Figures (Newcomer) omitted because of error in reading <sup>4</sup> Max R P rise not typical (?) See discussion <sup>5</sup> Max, 22 5% 5th day <sup>6</sup> Max 18 5% 5th day <sup>7</sup> Max

effectiveness may not parallel the clinical response. Further clinical comparison is necessary to settle the question of specificity or practical utility.

## REFERENCES

- (1) Janet M. Vaughan, G. L. Muller and L. Zetzel, *Brit J Exptl Path*, 11 (1930) 456
- (2) C. W. Edmunds and H. H. Brueckner, *J Pharmacol*, 45 (1932), 258
- (3) C. W. Edmunds, H. H. Brueckner and Agnes I. Fritzell, *Jour A Ph A*, 22 (1933), 91
- (4) G. Fontes and L. Thivolle, *Compt rend soc biol*, 106 (1931) 219

## A METHOD FOR THE DETERMINATION OF MINUTE AMOUNTS OF ALDEHYDES IN ETHER \*

BY M. W. CAREY, L. W. GREEN AND R. E. SCHOETZOW

Several investigators (1, 2) have shown that the U. S. P. X test, for aldehydes in ether, is not sensitive to small amounts. The use of solid potassium hydroxide instead of the solution which is directed by the U. S. P. X, will increase the sensitivity so that between 50 and 100 parts per million of acetaldehyde may be detected.

\* Scientific Section A. Ph. A. Toronto meeting, 1932

We desired a method capable of detecting as well as estimating much smaller quantities of aldehydes than those detectable by the U S P X and similar tests

A search of literature seemed to show that the most sensitive tests for aldehydes in ether are those employing fuchsine sulphurous acid, alkaline silver nitrate and Nessler's reagent

The silver reduction test is performed with reagents composed of silver nitrate, sodium hydroxide and ammonia. The disadvantages are that reducing substances in general will react with ammoniacal silver nitrate and also if care is not exercised to immediately destroy the test materials, accidents may result, because the materials may explode upon standing. The test appears to be sensitive to one part per million, but, since it is not specific for aldehydes, we discarded it from consideration.

Nessler's reagent, likewise, although equally sensitive is not specific for aldehydes. The other impurities, which may be present in ether, such as peroxide will affect the test. Even alcohol, a substance which is normally present in anesthetic ether, reacts with Nessler's reagent within a few minutes. For these reasons, we discarded it, notwithstanding its official recognition in some foreign pharmacopœias.

The fuchsine sulphurous acid reagent has been used by Phelps and Rowe (3) in a quantitative manner with a sensitivity of about 30 parts per million.

Articles by Leffman and Pines (4) and Leffman and Trumper (5) showed that a fuchsine sulphurous acid reagent formulated by Fincke was extremely sensitive to aldehydes in ether, so sensitive in fact that they stated that it might be necessary to fix a toleration limit for practical control. We studied the use of this reagent and found it very sensitive. Although we found by experiment conditions under which it could be used in a quantitative manner capable of estimating aldehydes within two or three parts per million, yet it was not entirely satisfactory, because we had to run the test at a low temperature. Even at that temperature, some slight oxidation of the reagent seemed to occur, which gave rise to questionable readings at times.

Middleton and Hyman (6) published an excellent review of the various tests for aldehyde in ether. In this article, they stated that in testing ether, the use of Schiff's reagent (7), which is a fuchsine sulphurous acid reagent, had been limited by uncertainty as to its significance owing to the color showing a progressive increase in time, but that this objection could be removed by the addition of 0.1% pyrogallol, which does not decrease sensitivity, but does restrain oxidation.

Recently we substituted the decolorized fuchsine solution of the British Pharmacopœia, 1914 edition, with the addition of 0.1% of pyrogallol for the Fincke reagent which we had been using for some time and found that a definitely negative test could always be obtained with ether specially treated so as to be aldehyde-free. At the same time this reagent is sensitive enough to disclose aldehydes when added to the same ether in the proportion of one part per million. The test has the advantage that it may be run at room temperature while previously we had been obliged to use a lower and accurately controlled temperature.

The desirable features of this method are as follows:

1. It is sensitive to less than one part per million of aldehyde in the hands of the average operator and can be used to estimate somewhat larger quantities of

aldehydes with an accuracy of plus or minus two parts per million and perhaps plus or minus five parts per million for quantities up to about 50 parts per million

2 The reaction is specific for aldehydes while compounds other than aldehydes likely to be present in ether give negative results. The compounds tried included peroxides, acetone and alcohol

3 Results obtained were readily checked

The details for carrying out the test are as follows

#### PREPARATION OF FUCHSINE SULPHUROUS ACID TEST SOLUTION

Prepare decolorized fuchsin solution according to the formula given in the 1914 edition of the British Pharmacopœia, which is as follows

‘ Dissolve one gram of Fuchsin in five hundred millilitres of hot Distilled Water, add slowly twenty millilitres of a saturated aqueous solution of Acid Sodium Sulphite, and then, also slowly ten millilitres of Hydrochloric Acid, the mixture being kept well shaken. Cool and add sufficient Distilled Water to produce one thousand millilitres ’ To this add 0.1% of pyrogallol

NOTES 1 Basic fuchsin dyes of different brands vary in sensitivity

2 Certain samples of fuchsin cannot be entirely bleached with sulphurous acid. We have found the resultant amber-colored solutions less sensitive than the colorless ones, which may be prepared from better brands of fuchsin

3 Fuchsin sulphurous acid solution should be kept in a refrigerator to prevent decomposition

#### PREPARATION OF ALDEHYDE-FREE ETHER

Shake continuously equal parts of ether and sodium bisulphite solution (30%) for one hour. Separate and discard the sodium bisulphite solution. Then add to the ether, one-fifth of its volume of sodium hydroxide solution (10%) and shake for ten minutes. Separate and discard the sodium hydroxide solution. Test the ether according to the method given below. A colored line or band must not be produced

#### PREPARATION OF ALDEHYDE STANDARDS

(a) Prepare aldehyde-free alcohol and the primary standard acetaldehyde solution therefrom containing 1 Gm. acetaldehyde per 100 cc., according to the Methods of Analysis of the A. O. A. C. (8)

(b) Accurately measure 1 cc. of the standard aldehyde solution prepared under (a) and dilute to 100 cc. with aldehyde-free ether. Mix thoroughly. This solution contains 100 p. p. m. of acetaldehyde. Dilute this solution further with aldehyde-free ether to prepare dilutions containing 50, 30, 10 and 5 p. p. m. of acetaldehyde. After a preliminary test using these standards, other standards can be prepared to match the sample under examination

NOTE The primary standard acetaldehyde solution as prepared under (a) and the secondary or dilute standards as prepared under (b) should be kept in a refrigerator. The former will retain its strength for at least two weeks. The others must be prepared freshly

#### THE QUANTITATIVE ALDEHYDE DETERMINATION

Place 5 cc. of the ether under examination, 5 cc. of each of the appropriate standards, including one containing aldehyde-free ether as a blank, into separate

8" x 1" test-tubes preferably arranged in a rack under good light and provided with a white background. Then add slowly to each tube a 5-cc portion of decolorized fuchsine test solution, holding the tip of the pipette just over the surface of the ether so as to float the ether quietly over the test solution. Do not shake or disturb the tubes. At the end of twenty minutes, observe the color at the junction of the two layers. The aldehyde content of the ether under examination is the same as that of the standard which it matches.

If necessary, repeat the comparison with stronger or weaker standards.

NOTES 1 A match or nearly a match must result before making a decision as to the aldehyde content of the ether. This is necessary, since the color is not directly proportional to the aldehyde content. For instance, the ether containing 50 p p m of aldehyde will not give twice as heavy a red band as one containing 25 p p m.

2 Do not shake the tubes nor disturb them until the time of examination, it causes the faint colored bands produced by minute amounts of aldehyde to be dissipated throughout the aqueous layer and, practically, to disappear.

The substitution of the British Reagent plus pyrogallol for the Fincke's Reagent has occurred so recently that we have not had so much experience as desired, but we believe it the most satisfactory of all we have worked with and will continue our work with it.

#### REFERENCES

- (1) E Mallinckrodt, Jr, *J A C S*, 49 (1927), 2655
- (2) F Van Dripe, L W Green and R E Schoetzow, *Jour A Ph A*, 18 (1929) 1228
- (3) E P Phelps and A W Rowe *J A C S* 48 (1926), 1049
- (4) H Leffman and C C Pines, *Am J Pharm* 102 (1930), 58
- (5) H Leffman and M Trumper, *Ibid*, 99 (1927) 290
- (6) G Middleton and F C Hyman, *Analyst*, 56 (1931) 238
- (7) H Schiff, *Ann*, 140 (1866), 132
- (8) Methods of Analysis, *A O A C* 3rd Edition, page 144

NOTE This paper was read at the Toronto meeting of the A Ph A in 1932. Since that time we have found it advisable to standardize the temperature at 20° C at which to perform the test. We have also found it advisable to use redistilled acetaldehyde and aldehyde free ether in the preparation of the aldehyde standards instead of the methods mentioned above.

ANALYTICAL LABORATORIES  
CHEMICAL & PHARMACEUTICAL DIVISION,  
E R SQUIBB & SONS

---

*A Ph A Resolution No 10 Thanks to Council on Medical Education and Hospitals of American Medical Association*

*Resolved* that the thanks of the AMERICAN PHARMACEUTICAL ASSOCIATION be expressed to the Council on Medical Education and Hospitals of the American Medical Association for the favorable attitude expressed by resolution of this body on the subject of hospital pharmacies and their supervision and be it further

*Resolved*, that the AMERICAN PHARMACEUTICAL ASSOCIATION continue its endeavors to provide for the supervision of all pharmaceutical work in hospitals by registered pharmacists

---



QUALITATIVE TESTS FOR EPHEDRINE AND ITS DERIVATIVES\*.<sup>1</sup>

BY C T FENG AND B E READ

In the course of our research upon the best quantitative method of assay for ephedra and its alkaloids we undertook a large number of qualitative tests with a view of possibly finding one which would prove of worth in quantitative work. While this has not been definitely attained much useful information has been brought together concerning the reaction of ephedrine and its derivatives toward various laboratory reagents which we herewith report.

Chen in 1925 (1) in one of his first reports from these laboratories gave a list of reactions of ephedrine with several of the commoner laboratory reagents, and later Chen and Kao (1926) (2) summarized the various tests known *q v*, which it is unnecessary for us to go over again now.

Tsiang and Brown (1927) (7) gave a more complete report upon the gold and platinum salts made with solutions of ephedrine varying in strength from 1 in 10,000 to 1 in 1000. With Krant's reagent they obtained a characteristic crystalline precipitate.

On account of the fact that Chinese ephedra has been shown to contain (a) ephedrine, (b) pseudoephedrine (6), and (c) methyl-ephedrine (5), we have carefully extended our tests to all three of these compounds, also to the (d) butyl, (e) benzyl and (f) quaternary halide compounds which have been synthesized in these laboratories (4).

Unless indicated otherwise, solutions of the above compounds were found to give their best reactions in the following concentrations: (a) and (b) five to ten per cent, (c) two and a half to five per cent, (d) and (e) one to two and a half per cent, and (f) one-tenth to one per cent.

## 1 BIURET TEST (MODIFIED) (3)

(a) *Ephedrine Hydrochloride*—A violet pigment very soluble in ether giving a brilliant solution, which when evaporated to dryness yields a gelatinous residue (3).

(b) *Pseudoephedrine Hydrochloride*—The pigment is more slowly soluble in ether yielding a solution of dull appearance, which when air dried produces beautiful violet crystals (3).

(c) *Methyl-Ephedrine Hydrochloride*—Vigorous shaking of the reaction mixture showed that the pigment was not extractable by ether but before shaking the ether dissolved some of the pigment.

(d) *Butyl-Ephedrine Hydrochloride*—Identical with (c).

(e) *Benzyl Ephedrine Hydrochloride*—The pigment was absolutely insoluble and was not extractable by ether.

(f) *Quaternary Halide*—No biuret coloration produced.

## 2 POTASSIUM IODIDE TEST A SATURATED SOLUTION ADDED TO A FIVE PER CENT SOLUTION OF EACH COMPOUND

(a) Prisms or rhombic bars (Fig 1)

(b) Hexagonal rhomboid plates (Fig 2)

(c) Slowly producing thin flaky crystals (Fig 3)

(d) Producing oily drops immediately, from which rosettes separate later (Fig 4)

\* The cost of these experiments was defrayed partly by a grant from the Council on Pharmacy and Chemistry of the American Medical Association.

<sup>1</sup>From the Department of Pharmacology, Peiping Union Medical College, Peiping, China.



Fig 1

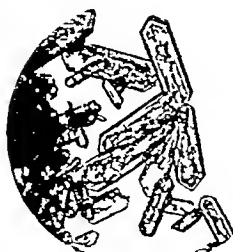


Fig 2



Fig 3



Fig 4



Fig 5



Fig 6



Fig 7



Fig 8



Fig 9

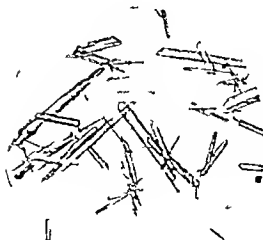


Fig 10



Fig 11



Fig 12

Fig 1—Potassium iodide and ephedrine hydrochloride Fig 2—Potassium iodide and pseudoephedrine hydrochloride Fig 3—Potassium iodide and methyl ephedrine hydrochloride

Fig 4—Potassium iodide and butyl ephedrine hydrochloride Fig 5—Cadmium potassium iodide and ephedrine Fig 6—Cadmium potassium iodide and methyl ephedrine

Fig 7—Picric acid and ephedrine Fig 8—Picric acid and pseudoephedrine Fig 9—Picric acid and methyl ephedrine

Fig 10—Ammonium thiocyanate and ephedrine Fig 11—Ammonium thiocyanate and pseudoephedrine Fig 12—Ammonium thiocyanate and methyl ephedrine

- (e) Only droplets which do not crystallize in one or two hours
- (f) Readily producing clusters of characteristic rhombic crystals (4)

### 3 AURIC CHLORIDE THREE PER CENT, MICRO-TEST (7)

- (a) Golden yellow sharp needles soluble in water and alcohol
- (b) Golden-yellow feathery needles, soluble in water and alcohol
- (c) Yellow prisms, soluble in water and alcohol
- (d) Yellow oily drops, slightly soluble in water readily in alcohol
- (e) Similar to (d)
- (f) Characteristic crystals

The butyl ephedrine mixture (d) evaporated to dryness yields a gelatinous mass which in several days crystallizes out, benzyl ephedrine yields no crystals

### 4 PLATINIC CHLORIDE TWO PER CENT MICRO TEST (7)

- (a) Pale yellow silky needles very soluble in water or alcohol
- (b) Pale yellow bunches of long needles very soluble in water or alcohol
- (c) Characteristic yellow needles, soluble in water or alcohol
- (d) Pale yellow rhombic hemihedral crystals Slightly soluble in water and very soluble in alcohol A quicker reaction than that with auric chloride
- (e) Pale yellow drops Slightly soluble in water, very soluble in alcohol
- (f) Characteristic fine needles (already published Feng 1932 (4))

### 5 CADMIUM POTASSIUM IODIDE TWENTY PER CENT

- (a) Only droplets separate which on standing crystallize out (Fig 5) Readily soluble in water
  - (b) Similar to (a)
  - (c) On standing clusters of characteristic needles are formed Soluble in water (Fig 6)
  - (d) Only droplets first appear, which later crystallize out in irregular forms Slightly soluble in water
  - (e) Similar to (d)
  - (f) Fine flakes readily separate out which are almost insoluble in water
- All of the above crystalline precipitates are soluble in alcohol or acetic acid

### 6 PICRIC ACID ONE PER CENT, MICROCHEMICAL TEST

- (a) Yellow needle shaped crystals, readily soluble in water Shaped like pine needles (Fig 7)
- (b) Yellow needle-shaped crystals soluble in water Less fine than (a) shaped like thorns (Fig 8)
- (c) Yellow feathery leaflets, soluble in water (Fig 9)
- (d) Yellowish flakes, slightly soluble in water
- (e) Yellowish globules slightly soluble in water
- (f) Characteristic yellowish needles, very soluble in water

These results are sufficiently characteristic to be used to distinguish these six compounds one from the other It is important to use the strengths of solutions given at the beginning of this report earlier workers using weaker solutions reported negative results (1), ephedrine in strong solution certainly yields a crystalline precipitate with picric acid one per cent

### 7 AMMONIUM THIOCYANATE SATURATED SOLUTION MICROCHEMICAL TEST

- (a) (Ephedrine in ten per cent solution) Elongated prisms (Fig 10)
- (b) (Saturated solution of pseudoephedrine hydrochloride) It sets to a glassy paste not showing discrete crystals (Fig 11)
- (c) (Five to ten per cent) Rhombic hemihedral plates (Fig 12)
- (d) (Two and a half to five per cent) Leaflets crystallize out on standing from the oily droplets which first separate out
- (e) (Two and a half to five per cent) Only droplets, which do not crystallize separate out

(f) (One to two and a half per cent) Prismatic hemihedral plates All of the above were readily soluble on the addition of water

#### 8 PHOSPHOMOLYBDIC ACID TEN PER CENT

All of the compounds with this reagent yielded a pale yellow precipitate, which became blue on standing for a definite length of time varying with the compound tested

(f) Methyl ephedrine methyl iodide	In 1 to 2 days
(d) Butyl ephedrine hydrochloride	In 2 to 3 days
(e) Benzyl-ephedrine hydrochloride	In 3 to 4 days
(a) Ephedrine hydrochloride (2)	In 4 to 6 days
(b) Pseudoephedrine hydrochloride	In 6 to 20 days
(c) Methylephedrine hydrochloride	In 6 to 20 days

#### 9 POTASSIO MERCURIC IODIDE MAYER'S REAGENT

The compounds all yielded a whitish precipitate, the solubility in water or dilute acids varying with the compound used

- (a) and (b) Readily soluble
- (c) Soluble
- (d) and (e) Not very soluble
- (f) Almost insoluble

#### 10 POTASSIUM TRI IODIDE WAGNER'S REAGENT

A strong solution of iodine five per cent and potassium iodide five per cent gave brown precipitates with all the compounds. The reagent diluted 0.2 per cent, gave no permanent precipitate with ephedrine in one per cent solution and only a cloudy effect with pseudoephedrine one per cent. Butyl and benzyl ephedrine in dilute solution of 0.1 per cent gave heavy precipitates

#### 11 POTASSIUM BISMUTH IODIDE KRANTZ'S OR THRESH'S REAGENT

A reddish precipitate insoluble in water is produced by all the compounds but on the addition of acetic acid (a) (b) and (c) were readily soluble, (d) and (e) were difficultly soluble and (f) was almost insoluble. (Tsang and Brown (7) used this test with ephedrine 1 in 1000 solution)

#### 12 MERCURIC CHLORIDE FIVE PER CENT

No precipitate was obtained from (a) (b) or (c) in five per cent solutions, (d) (e) and (f) yielded white precipitates soluble in excess of the reagent, or on the addition of water and weak acids

#### 13 SODIUM NITROPRUSSIDE FIVE PER CENT

Only butyl ephedrine and benzyl ephedrine in five per cent solution formed flesh white precipitates soluble in excess of water

#### 14 BISMUTH NITRATE FIVE PER CENT, SLIGHTLY ACIDIFIED WITH NITRIC ACID

They all yield white precipitates soluble in excess of nitric acid. This test is more sensitive than some, especially with the quaternary halides (f) each of which give a characteristic result described in another report (4). One of these quaternary compounds might be used to estimate bismuth

#### 15 AMMONIUM MOLYBDATE FIVE PER CENT

All the compounds form white precipitates soluble in excess of the reagent or on the addition of water the solubilities decreasing in the order cited as was the case in other tests

#### 16 PHOSPHOTUNGSTIC ACID TEN PER CENT

White curdy precipitates of nonspecific character were produced by all the compounds

## 17 ZINC CHLOR-IODIDE STEPHENSON'S REAGENT

There was obtained in all cases a brownish white precipitate insoluble on the addition of water, but soluble in dilute acetic acid

## 18 REAGENTS WITH NO VISIBLE REACTION

Tannic acid, barium nitrate, cobalt chloride, glucose, glycerine, manganese chloride, nickel chloride, phthalic acid, potassium ferri and ferrocyanides, sodium benzoate or nitrite. The reactions with potassium permanganate and chromic acid were so unstable that they seem worthless as test reagents for this class of compound

## NOTE

Many of the above tests confirm earlier reports upon the various reactions of ephedrine, but this is the only comprehensive statement dealing with solutions of known strengths

## LITERATURE CITED

- (1) K K Chen *Jour A Ph A*, 14 (1925), 189-194
- (2) K K Chen and C H Kao *Ibid*, 15 (1926), 625-639
- (3) C T Feng, *Chinese J Physiol* 1 (1927), 397-406
- (4) C T Feng, *Jour A Ph A*, 21 (1932), 8-15
- (5) C T Feng and B E Read *Chinese J Physiol* 2 (1928), 87-96
- (6) B E Read and C T Feng, *Ibid*, 1 (1927), 297-304
- (7) K Tsiang and E D Brown, *Jour A Ph A* 16 (1927), 294-296

A NOTE ON THE WATER CONTENT OF MAGNESIUM OXIDE \*<sup>1</sup>

BY JACOB E SCHMIDT AND JOHN C KRANTZ, JR

## INTRODUCTION

The Pharmacopœia recognizes dual standards for magnesium oxide and heavy magnesium oxide. The rubric requires 96 per cent purity after ignition and permits 10 per cent water to be present in the compounds in general use. In the preparation of the monographs for these compounds for the forthcoming edition of the Pharmacopœia, the authors had occasion to examine several commercial samples of each variety of magnesium oxide. The percentage of water found in the specimens showed great variation. In many instances the water content of the light variety exceeded the Pharmacopœial limit. The highest quantity of water found was 22 per cent.

On account of these findings, the authors investigated the problem and recorded their observations in this communication.

TABLE I—PERCENTAGE OF WATER IN COMMERCIAL SAMPLES OF MAGNESIUM OXIDE

No	Light Per Cent Water	Heavy Per Cent Water	No	Light Per Cent Water
1	22 0	7 8	8	11 5
2	20 3	7 8	9	18 0
3	20 3	7 8	10	21 9
4	19 2	3 4	11	19 3
5	19 4	6 5	12	22 5
6	14 0		13	14 5
7	17 9		Mean 18 5 per cent	

\* Scientific Section A Ph A, Madison meeting, 1933

<sup>1</sup> The expense of this investigation was defrayed in part by a grant from the Research Fund of the AMERICAN PHARMACEUTICAL ASSOCIATION

## EXPERIMENTAL

Three commercial samples of each variety of magnesium oxide were ignited to a constant weight and the absorption of water from the atmosphere was studied. The samples were stored at room temperature in crucibles with liberal access to air. The specimens were not mixed at the various intervals when the increase in weight was determined.

These data are recorded in Table II.

TABLE II

Time in Days	Light Variety Percentage Moisture			Time in Days	Heavy Variety Percentage Moisture			Relative Humidity
	I	II	III		I	II	III	
1	6 93	5 65	7 15	1	2 93	1 30	1 54	43
2	9 90	8 65	10 05	2	4 63	1 85	2 30	44
3	12 12	10 68	11 82	3	6 16	2 22	2 70	68
4	13 50	12 44	13 21	4	7 34	2 32	2 85	68
5	14 31	13 42	14 20	5	7 85	2 39	2 85	72
7	14 49	13 70	14 38	7	8 11	2 42	2 94	52
8	14 70	13 88	14 52	8	8 42	2 52	3 10	48
9	14 98	14 28	14 85	10	8 82	2 42	3 18	67
11	15 04	14 39	14 92	13	9 15	2 57	3 35	54
13	15 41	14 71	15 25	21	10 01	2 68	3 38	61
21	16 20	15 46	16 08	28	10 20	2 70	3 44	50
28	16 40	15 62	16 25	37	10 42			58
37	16 70	15 80	16 41					

## DISCUSSION AND CONCLUSIONS

The foregoing results indicate, that when stored under the usual commercial conditions, the light variety of magnesium oxide contains considerably more than 10 per cent of water average 18.5 per cent. The ratio  $\text{MgO} \cdot \text{H}_2\text{O}$  in the compound becomes quite stable at approximately 2:1.

The heavy variety of magnesium oxide as found commercially generally falls within the limit of the U. S. P. moisture requirement.

BUREAU OF CHEMISTRY,  
STATE OF MARYLAND DEPARTMENT OF HEALTH

## COOPERATION BETWEEN PHYSICIANS AND PHARMACISTS OF THE NORTHWEST

BY GEORGE BENDER—SYMPOSIUM ON "PRACTICING PROFESSIONAL PHARMACY"

'Some day I think some one should write a thesis on the leavening power of a cup of coffee. I think that would have more effect than anything else in bringing the physicians, pharmacists and dentists of the Northwest, particularly of the Twin Cities area, together.'

"About three years ago the doctors and druggists of Minneapolis, by mutual consent, decided it was time to get together and talk things over. Individual problems and individual misunderstandings had arisen from time to time, and no solution seemed possible. By common consent, a committee was appointed from the medical association, from the pharmaceutical association and from the dental association to get together and talk things over.

'From this humble beginning, what is now known as the Inter-Professional Relationship Committee has developed, and efficient committees are functioning in each of the Northwest states. These committees have done some rather remarkable things.' (We hope to have the paper for a later issue of the JOURNAL.)

# BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Compiled by A. G. DuMez, Reporter on the Progress of Pharmacy

All articles in these lists will be presented in abstract form in the bound volumes of the Year Book, which is issued annually. Those desiring abstracts immediately can obtain them for a fee of one dollar each by communicating with A. G. DuMez, University of Maryland, School of Pharmacy, N. W. cor. Lombard and Greene Sts. Baltimore, Maryland.

## APPARATUS AND MANIPULATIONS

Kroll, Fritz  
A new machine for filling ampuls  
*Pharm. Ztg.*, 78 (1933), 1108

## PHARMACOPŒIAS AND FORMULARIES

Albertus, Halvar  
Review of the Swiss (Cont.) Pharmacopœia V  
*Pharm. Revy.*, 32 (1933), 641, 653, 665  
Breugelmans, J. G.  
Some critical observations on certain analytical methods of the Belgian Pharmacopœia IV  
*J. Pharm. Belg.*, 15 (1933), 733, 749, 765  
Caspary, P.  
Review of the Swiss Pharmacopœia V  
*Schweiz. Apoth. Ztg.*, 71 (1933), 377, 394, 626  
Hampshire, C. H.  
Review of the new Swiss Pharmacopœia  
*Pharm. J.*, 131 (1933), 511  
Rosenthaler, L.  
Review of the Swiss Pharmacopœia V  
*Pharm. Zentralh.*, 74 (1933), 670, 701

## PHARMACEUTICAL PREPARATIONS

Babitsch, S.  
Lead plaster  
*Irish Pharm.*, 271 (1933), 446  
Batson, F. R. C.  
Solutions of arsenious and mercuric iodides  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 517  
Brown, H. Treves  
Mistura Bismuthi Hydroxidi  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 502  
Brown, H. Treves  
Some proposed new formulæ for the British Pharmaceutical Codex  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 506  
Caines, Charles H. and Evers, Norman  
Loss of color of compound tincture of cardamom in certain mixtures  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 486  
Feriz, H.  
Use of iodoform gauze in surgery  
*Pharm. Weekbl.*, 70 (1933), 1158

Jensen, Wilh., and Orner, Holger  
Comparison of values of different substances as preservatives for medicinal preparations  
*Dansk. Tids. Farm.*, 7 (1933), 205  
Morrison, S. W.  
Amaranth as a substitute for cudbear with improved methods for the preparation of some N. F. galenicals  
*Jour. A. Ph. A.*, 22 (1933), 1112  
Rowe, L. W., and Seoville, Wilbur L.  
Tincture of digitals  
*Jour. A. Ph. A.*, 22 (1933), 1087  
Smelt, E. M.  
Keeping properties of Liquor Arsenicalis  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 375  
Smelt, E. M.  
Keeping properties of Liquid Extract of Ergot  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 399  
Woodard, W. A. and Cowland, A. N.  
Stability of aqueous solutions of gallotannic acid  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 363

## PHARMACOLOGY, TOXICOLOGY AND THERAPEUTICS

Blicke, F. F., and Stockhaus, R. P. G.  
Germicidal action of 2-chloro-4-n-alkylphenols  
*Jour. A. Ph. A.*, 22 (1933), 1090  
Coward, K. H. et al.  
Determination of vitamin A  
*Biochem. J.*, 27 (1933), 873 through *Pharm. J.*, 131 (1933), 541  
Goshay, Lee  
Antiserum for the treatment of tularemia  
*J. A. M. I.*, 101 (1933), 1447  
Gage, J. C.  
Variation in the susceptibility of mice to certain anesthetics  
*Quart. J. Pharm. & Pharmacol.*, 6 (1933), 418  
Horner, Clyde E., et al.  
Reports of cases of dermatitis, conjunctivitis and corneal ulceration following use of eye lash dye  
*J. I. M. A.*, 101 (1933), 1558-1560

Helms, Samuel T

Some facts concerning the pharmacological action of acetanilid

*Jour A Ph A*, 22 (1933), 1093

Lozinski, E, *et al*

Relative activity of ergotoxine and ergotamine with special reference to the assay of ergot preparations

*Quart J Pharm & Pharmacol* 6 (1933) 395

Myers, G N

New morphine substitutes

*Brit Med J* No 3788 (1933) 282

Offerhaus, C and Baert, C G

Anesthetics, particularly cocaine and novocaine (Cont)

*Pharm Weekbl*, 70 (1933), 1125, 1193

Tainter, M L *et al*

Use of dinitrophenol in obesity and related conditions

*J A M A* 101 (1933) 1472

Tamamushi Y

Synthesis of homologues of histamine and their pharmacological action

*J Pharm Soc Japan*, No 620 (1933), 226

Wolke, Frank

Effect of calcium administration on the toxicity of carbon tetrachloride in mice

*Quart J Pharm & Pharmacol*, 6 (1933) 413

## BOTANY AND PHARMACOGNOSY

Bondeson, Wolmar

*Euphorbia pilulifera* herb (Cont.)

*Farm Revy*, 32 (1933), 621

de A Costa, O

Pharmacologic study of manaca (*Brunfelsia hopeana*)

*Bol assoc brasil pharm*, 14 (1933) 295, through *Chem Abstr*, 27 (1933), 5889

Dewar, T

Histology of the leaves of *Digitalis Thapsi*

*Quart J Pharm & Pharmacol* 6 (1933), 443

Freudweiler R

Detection of the falsification of drugs and their microscopic examination with ultraviolet light

*Pharm Acta Helv*, 8 (1933) 190

Lewis S Judd and Wombwell J

Spectroscopic investigation of gum acacia

*Quart J Pharm & Pharmacol*, 6 (1933) 475

Liberalli C H

Chemistry of *Mikania hirsutissima*, D C

*Rev soc brasil Quim*, 4 (1933), 5, through *J Soc Chem Ind Suppl*, 52 (1933) 891

Rae, John

Comparison of the action of various solvents on defatted cochineal

*Quart J Pharm & Pharmacol* 6 (1933) 483

Smelt, E M

Chemical tests for *strophanthus*

*Quart J Pharm & Pharmacol*, 6 (1933), 467

Valier, P

Chemical composition of *Retama sphaerocarps* Boiss

*Bull sci pharmacol*, 40 (1933), 520

van Giffen, H J

Investigation of thyroid glands

*Pharm Weekbl*, 70 (1933), 1101

Wallis, T E, and Dewar, T

Comparative study of the anatomy of *buchu* leaves and other species of *Barosma*

*Quart J Pharm & Pharmacol*, 6 (1933), 347

Wasicky, R, and Oeriu, S

Bark of *Ailanthus glandulosa* and the bitter principle *ailanthin*

*Pharm Presse Wiss Heft* 38 (1933) 120

## ALKALOIDS AND GLUCOSIDES

Grimme Clemens

Determination of arbutin in *uva ursi* leaves and their preparations

*Pharm Zentralh* 74 (1933) 669

Haugen

Quantitative determination of alkaloids in ointments

*Norsk farm Tidsskr* (1932), 115, through *Pharm Zentralh* 74 (1933), 721

Harold, M

Preparation and purification of the alkaloids of ergot

*Chim et Ind* 29 (1933), Spec No 1017, through *J Soc Chem Ind Suppl*, 52 (1933) 938

Klimek, Romuald

New reaction for the differentiation of theophylline from theobromine and caffeine

*Wladomasci Farm* 60 (1933), 393 through *Chem Abstr* 27 (1933) 5895

Mascre M and Caron M

Chemical and physiological assays of some lobelias

*Bull sci pharmacol* 40 (1933), 519

Mingoa, Q

Action of ultra-violet light of various frequencies on alkaloid solutions

*Ann chim applicata* 23 (1933), 318, through *Chem Abstr* 27 (1933), 5889

Oakley, Margarethe

Comparative study of the assays of cinchona bark

*Am J Pharm*, 105 (1933) 535

Raymond Hamet

New method for the extraction and separation



of the alkaloids of *Pseudocinchona africana*  
A Chev

*Bull sci pharmacol*, 40 (1933), 523

Tersaka, M

Investigation of the alkaloids of the root bark of  
*Oriza Japonica* III

*J Pharm Soc Japan*, No 620 (1933) 219

Vinogradova, L N

Conductometric method of determining alka-  
loids in weak solutions, and morphine in com-  
mercial opium

*J Appl Chem (USSR)* 6 (1933), 150,  
through *Chem Abstr* 27 (1933) 5839

Ware, Alan H and Smith Victor

Precipitation of alkaloids by tannins and the  
use of antipyrine in the detection of tannins

*Quart J Pharm & Pharmacol*, 6 (1933), 454

### ESSENTIAL OILS

Gstirner, I

Estimation of essential oil in camomile flowers

*Deutsch Apoth*, 2 (1933) 97 through *Chem  
Abstr* 27 (1933), 5477

Glichtch, L S, and Naves Y R

Essential oils of *Ocimum canum*, Sims and O  
*gratissimum* L

*Chim et Ind*, 29 (1933), Spec No 1029  
through *J Soc Chem Ind Suppl* 52 (1933)  
939

Glichtch L S, and Naves, Y R

Determination of primary alcohols in essential  
oils by phthalic anhydride

*Chim et Ind*, 29 (1933) Spec No 1024,  
through *J Soc Chem Ind Suppl* 52 (1933),  
939

Huerre, R

Pseudo iodine indices of essential oils

*J pharm chim*, 18 (1933) 381

Unger Fritz

Remarks on natural and synthetic menthol

*Pharm Ztg*, 78 (1933), 1202

### OILS, FATS AND WAXES

Doree Charles and Garratt, Donald C

Chemistry of lanosterol

*J Soc Chem Ind*, 52 (1933) 355T

Dyer F J

Relationship between the antimony trichloride  
blue value of cod liver oils and that of their  
unsaponifiable fractions

*Quart J Pharm & Pharmacol* 6 (1933), 338

Evers Norman, and Smith Wilfred

Analytical classification of fish liver oils

*Quart J Pharm & Pharmacol*, 6 (1933), 329

Éwe, George E

Medicinal cod liver oil—observations on color  
and viscosity

*Jour A Ph A*, 22 (1933), 1080

Éwe George E

Cod liver oil—stability of vitamin A content  
under conditions of commercial distribution

*Jour A Ph A* 22 (1933), 1085

Holmes, Arthur D, and Tripp Francis

Color standards for cod liver oil

*Jour A Ph A*, 22 (1933) 1102

Kawai K

Pharmacognostical studies on Japanese cod  
liver oil (Cont)

*J Pharm Soc Japan*, No 620 (1933), 183

### ANALYTICAL METHODS AND RESULTS

Allport, Noel L

New method for the determination of elemental  
sulphur

*Quart J Pharm & Pharmacol*, 6 (1933), 431

Bennett C T, and Campbell, N R

Determination of iron

*Quart J Pharm & Pharmacol*, 6 (1933) 436

Dyer F J

Estimation of parathyroid hormone

*Quart J Pharm & Pharmacol* 6 (1933), 426

Elliott G H

Method for the determination of rate of solu-  
tion of tablets

*Pharm J*, 131 (1933), 514

Ferrey G J W

Determination of moisture in mercuric oxide

*Quart J Pharm & Pharmacol*, 6 (1933), 406

Ferrey, G J W

B P limit test for more soluble sugars in lactose

*Quart J Pharm & Pharmacol*, 6 (1933), 411

Glass, Norman

Variation in solubility of calcium lactate

*Quart J Pharm & Pharmacol* 6 (1933), 522

Kleschnja, A M

Quantitative determination of phenol in ampuls  
of sodium arsenate

*Pharm Zentralh*, 74 (1933) 689

Mayrhofer A and Beck, Anatol

Contribution to the characterization and testing  
of tinctures

*Pharm Presse Wiss Heft* 38 (1933), 129

Munch, James C, et al

Quantitative applications of the modified Turk  
test

*Jour A Ph A*, 22 (1933), 1078

Peronnet Marcel, and Truhaut Rene

Color reactions furnished by metadinitroben-  
zene in alkaline medium

*J pharm chim*, 18 (1933) 339

Powell, A D, and Hall, G F

Determination of acriflavine and related medicinal dyes

*Quart J Pharm & Pharmacol*, 6 (1933), 389

Powell A D

New color reaction for bismuth

*Quart J Pharm & Pharmacol*, 6 (1933), 464

Schrader, Hellmuth

Measurement of viscosity as a means of evaluating tinctures

*Pharm Ztg* 78 (1933), 1159

Straub, Johann, and Mihalovitis, Eugen

Microvolumetric determination of bismuth in pharmaceutical preparations

*Pharm Zentralh*, 74 (1933), 685

Veness, B R

Yield of extractive in unstandardized official extracts

*Quart J Pharm & Pharmacol* 6 (1933) 531

von Mikó Julius

Argentometric estimation of hexamethylene-tetramine

*Pharm Zentralh*, 74 (1933) 642

## ORGANIC CHEMICALS

Butchers, W H, *et al*

Preparation and storage of solutions of tribromomethyl alcohol

*Quart J Pharm & Pharmacol*, 6 (1933), 533

Haddock, L A

Changes in acid solutions of adrenaline

*Quart J Pharm & Pharmacol*, 6 (1933), 496

Kahane, Ernest

Hydrates of paraaminophenylarsinate of sodium

*J pharm chim*, 18 (1933), 134

Morton, C

Decomposition of acetylsalicylic acid in aqueous solution

*Quart J Pharm & Pharmacol*, 6 (1933), 492

Preparation of glutathione

Regnier M Th

*J pharm chim*, 18 (1933), 369

Thompson, H E, and Dragstedt, C A

Chemical and pharmacological properties of calcium acetylsalicylate

*Jour A Ph A*, 22 (1933) 1096

## THE IDENTIFICATION OF SOME HYPNOTICS OF THE BARBITURIC ACID SERIES

BY GEORGE W HARGREAVES AND H W NIXON

Barbituric acid derivatives due to their wide-spread use as hypnotics have become of increased importance in analytical work of a toxicological or pharmaceutical nature

Numerous qualitative tests have been proposed for barbital and other individual members of this group but no reaction has been applied to a whole series of these compounds. In most cases, only a few derivatives have been investigated. It is necessary to know in using a qualitative test whether it is specific for the substance being tested or whether it may be simulated by some related compound. For this investigation, samples of most of the widely used barbituric acid derivatives were obtained.

After a comprehensive survey of the literature, a number of reactions were selected which might provide a scheme for the detection and positive identification of any member of the group studied. It will be seen from the table of results that this purpose has been accomplished.

### EXPERIMENTAL

*Solubility Tests*—The free acids are only sparingly soluble in water but readily dissolve in 5% sodium carbonate or hydroxide. The ethyl isopropyl derivative is used in the form of the calcium salt (Ipral) and is readily soluble in water. Others commonly employed in the form of their sodium salts are the diethyl, phenyl ethyl, ethyl, *l*-methyl butyl (Nembutal) and ethyl isoamyl (Sodium Amytal) barbituric

acids Acidification of the aqueous solutions of these salts yields a precipitate of the free acid unless the solutions are very highly diluted

*Melting Points*—A variation in melting points was found in the literature for several of these compounds Recently, Fischer and Kofler (1) have shown that barbital can exist in three modifications Allyl, isopropyl barbituric acid (2) can exist in two forms

*Para-Nitrobenzyl Derivatives*—Lyons and Dox (3) have used *p*-nitrobenzyl chloride for the identification of barbituric acid derivatives In addition to those prepared by them, the *p*-nitrobenzyl derivatives of ethyl, *l*-methyl butyl, ethyl, cyclohexenyl, and allyl, isopropyl barbituric acid were prepared

0.5 Gm of substance and 0.25 Gm of sodium carbonate are dissolved in 5 cc of water, 0.85 Gm of *p*-nitrobenzyl chloride in 10 cc of alcohol is added and the mixture refluxed about an hour If the derivative precipitates during the reaction it is filtered hot If no precipitate forms, the sample is cooled If still no precipitate forms, hot water is added until a cloudiness results Recrystallize from alcohol

*Permanganate Test*—0.05 Gm of substance is dissolved in 5 cc of 5%  $\text{Na}_2\text{CO}_3$  and 5 drops of 0.1N permanganate is added This reaction serves to distinguish "Dial," "Phanadorn" and allyl, isopropyl barbituric acid, and can also be used for the quantitative determination of these substances

*Precipitation Tests*—For these reactions, saturated solutions of the free acids were used 5-cc portions of these solutions were tested with 1 cc of the reagent, then followed by an excess The precipitants employed were

Mercuric Nitrate T S Mercuric Sulphate T S Saturated Aqueous Solution of Mercuric Chloride Results are given in the table

#### COLOR REACTIONS

*Concentrated Sulphuric Acid*—0.1-Gm samples were treated with a few drops of conc  $\text{H}_2\text{SO}_4$  No coloration was observed except in the case of Phanadorn which gave a distinct reaction This reaction is very sensitive with Phanadorn, a good test being obtained with as small a quantity as one mg

*Formalin Sulphuric Acid* (4)—0.01-Gm samples were treated with 1 cc of 10% formaldehyde and 4 cc of conc  $\text{H}_2\text{SO}_4$  and observed after standing two minutes at room temperature and were then heated a minute on the water-bath Results are given in the table

*Nitrite Sulphuric Acid* (5)—0.1-Gm samples were treated with 1 cc of conc  $\text{H}_2\text{SO}_4$  and 2 drops of a 2% sodium nitrite solution and observed first cold and then after heating on the water-bath

TABLE OF RESULTS

	B Acid	M p ° C Uncorr	M p of Nitrobenzyl Derivative	Permanganate Test
1	Diethyl (Barbital)	190-191	192	Negative
2	Ethyl isopropyl (Ipral)	200-203	160	
3	Ethyl, <i>n</i> butyl (Neonal)	126-128	146	Positive
4	Ethyl, <i>l</i> -methyl butyl (Nembutal)	129-130	142	
5	Ethyl isoamyl (Amytal)	154-156	138	
6	Ethyl phenyl (Luminal)	172-174	182	
7	Ethyl cyclohexenyl (Phanodorn)	171-174	195	
8	Allyl isopropyl	138.5-140.5	191	
9	Diallyl (Dial)	170-171	190	

	HgSO <sub>4</sub>	Hg(NO <sub>3</sub> ) <sub>2</sub>	HgCl <sub>2</sub>	Conc H <sub>2</sub> SO <sub>4</sub>
1	Precipitate soluble in excess	Precipitate soluble in excess	Negative	No color
2			Slight	
3			Positive	
4				
5			Negative	
6			Positive	
7				Orange red
8			Negative	No color
9				

	Formalin Sulphuric	Nitrite Sulphuric Cold	Sulphuric Hot		Formalin Sulphuric	Nitrite Sulphuric Cold	Sulphuric Hot
1	Slight yellow	No color	No color	6	Dark red	Yellow	Yellow
2				7	Red brown when	Same as	Same as
3					heated green	with	with
4					fluorescence	H <sub>2</sub> SO <sub>4</sub>	H <sub>2</sub> SO <sub>4</sub>
5	Greenish yellow on heating			8	Negative	Negative	Negative
				9	Light yellow greenish on heating slight fluorescence	Slight yellow	Red

## MICROCHEMICAL REACTIONS

For one interested in supplementing these tests with microchemical reactions the following references are suggested

- L Van Itallie and van der Wen *Pharm Weekblad* 56 (1919) 1112-1117, through *C A*, 13 (1919) 3277  
 L Van Itallie and Steenhauer *Ibid* 67 (1930) 797-785 through *C A* 24 (1930) 5934  
 G Deniges *Mikrochemie* "(N S)" 3, 316-323, through *C A* 25 (1931) 435-437

## ACKNOWLEDGMENT

The writers wish to express their appreciation to the following manufacturers who furnished them with generous samples of their respective products Winthrop Chemical Co., Abbott Laboratories, E. R. Squibb and Sons, Ciba, Hoffmann-La Roche, Eli Lilly and Co.

## REFERENCES

- (1) *Arch Pharm* 270 (1932) 207
- (2) *Ibid* 270 (1932) 149
- (3) *J Am Chem Soc*, 51 (1929), 288-291
- (4) *Pharm Zentralhalle* 17 (1926) 481-482, through *C A*, 20 (1926) 3330
- (5) *Boll chim farm*, 64 (1926), through *C A* 20 (1926) 477

ALABAMA POLYTECHNIC INSTITUTE  
 SCHOOL OF PHARMACY  
 AUBURN ALABAMA

## DISINFECTANTS IN MINERAL WATER BOTTLES

The Medical Superintendent Officer of Health of Belfast has received a deputation from mineral water merchants in the city who drew attention to the practice of utilizing mineral water bottles to hold disinfectants. In support of this contention they had produced mineral water bottles bearing the label "Carbolic Acid" and the name of the vendor firm.

## A PRACTICAL ENTERIC COATING FOR THE RETAIL PHARMACIST \*

BY F S BUCKY AND PHYLLIS RHODES <sup>1</sup>

Several references to the use of gelatin treated with formaldehyde as an enteric coating for pills and capsules are to be found in the literature. The results reported from these researches are varied. Hausmann (1) patented the process of immersing filled capsules in an 0.8 per cent solution of formaldehyde for 18 minutes. Dr. Hans Rumpel (2) patented the process of treating empty capsules with mixtures of formaldehyde and other solvents. He made the claim that the capsules would not harden with age. Smith (3) immersed filled capsules in 10 per cent aqueous solution of formaldehyde for 15 minutes. Ballenger and Elder (4) suggest two methods, one in which the capsule is immersed in 1 part of 40 per cent formaldehyde solution in 40 to 60 parts of water. In the other the capsules are exposed to the vapors of formaldehyde for 6-12 hours. DeLanney (5) reports soaking unfilled capsules in 20 per cent formaldehyde solution for several hours. Scoville (6) immersed filled capsules in a 1 per cent solution of formaldehyde for 30 seconds and suggests that they be stored for two weeks before they are used. In a second paper (7) Scoville states that he uses the same solution concentration and that the capsules will be in good condition for a year. Cooper and Dyer (8) in their textbook, "Dispensing for Pharmaceutical Students," state that filled capsules immersed in formaldehyde solution B. P. (36 to 38 per cent w/v) for 10 minutes have an ideal enteric coating. They also claim that the rate of the solution in the pancreatic fluid varies inversely with the length of the formaldehyde treatment. They find that a capsule treated for 5 minutes requires 3 hours for digestion but one treated for 15 minutes digests in 1 hour.

It would seem from the results of the above investigations that almost any concentration of formaldehyde solution could be used in the treatment of enteric coated capsules. It was decided, however, to check some of this work using the X-ray to locate the point of disintegration. Both pills and capsules were used in this study. The pill mass was made of 95 parts barium sulphate, 5 parts althea root and a sufficient quantity of syrup. Methylene blue was also added to some of the masses. The pills were about one-quarter inch in diameter, when dry they were coated with gelatin. The gelatin solution used for the coating was prepared by warming flake gelatin in sufficient water to make a thick solution. It was found that the pill could be removed from the pin used for dipping, without sticking to the fingers, in about two minutes. The small hole left by the pin was sealed by touching this spot with a hot spatula. The gelatin coating was then allowed to harden. Capsules, size O, filled with barium sulphate were used and sealed in the usual manner. The pills and capsules were then ready for immersion in formaldehyde solution.

Each of the subjects in this experiment was given a pill and capsule to be taken at the same time. The first picture was taken one hour after the pills had been swallowed. If the pill and capsule appeared low for the normal position of

\* Section on Practical Pharmacy and Dispensing, A. Ph. A., Madison meeting, 1933.

<sup>1</sup> The authors wish to express their thanks to Prof. C. L. Wible of the department of Physiology, University of Nebraska, for suggesting the problem.

the stomach, two ounces of Bari-o-meal in eight fluidounces of water were given before the next picture. The second picture was usually taken at the end of the second hour. The barium sulphate outlined the stomach so that the exact position of the pill and capsule could be located. The Bari-o-meal masked the pill and capsule in a very few cases.

The results of the experiment are listed according to the concentration of the aqueous formaldehyde solution and the length of the time immersed. The observations and results are listed as follows:

*40% Time 10 Minutes*—Two subjects were used. Pictures were taken for 4 hours, with negative results on disintegration. In one case the pill contained methylene blue and in the other case, the capsule. The urine was not colored in either instance.

*40%, Time 1 Minute*—Two subjects were used. Pictures were taken for 7 hours. In one case the pill and capsule were in the stomach at the end of 7 hours. In the other case they remained in the stomach 2 hours and disintegrated in the intestine at the end of 5 hours.

*40%, Time 15 Seconds*—Two subjects were used. In one case pictures were taken for 5 hours. Pill and capsule remained in the stomach 3 hours, not disintegrated at the end of 5 hours. In the other case pictures were taken for 3 hours. Pill and capsule remained in the stomach 1 hour. At the end of 3 hours the pill was low in the intestine and the capsule had disintegrated.

*20%, Time 15 Seconds*—Two subjects were used. Eight pictures were taken. In one case the pill and capsule were in the stomach at the end of 5 hours and were still intact at the end of 8 hours. In the second case the pill was in the stomach at the end of 8 hours, the capsule was in the intestine intact. In both of these cases methylene blue indicated disintegration at a later time.

*10%, Time 4 Minutes*—Three subjects were used. Pictures were taken for 8 hours. In each of the three cases the pill and capsule were in the stomach at the end of 8 hours. Methylene blue gave no evidence of later disintegration.

*10%, Time 15 Seconds*—Four subjects were used. In one case five pictures were taken. The pill left the stomach in 2.5 hours and disintegrated in the intestine in 2 hours. The capsule remained in the stomach 3 hours and disintegrated in the intestine in 2 hours. In the second case, six pictures were taken. The pill and capsule remained in the stomach 4 hours and disintegrated in the intestine in 2 hours. In the third case seven pictures were taken. Pill and capsule left the stomach in 3 hours. The capsule disintegrated in the intestine in 4 hours but the pill remained intact. In the fourth subject both the pill and capsule were in the stomach at the end of 7 hours.

*10%, Time 10 Seconds*—Two subjects were used. In one case six pictures were taken. The pill disintegrated in the intestine in 3 hours and the capsule in 5 hours. In the second subject the fate of the pill was unknown but the capsule disintegrated in the intestine in 5 hours.

*10% Time 5 Seconds*—Two subjects were used in this experiment, both reacted in almost the same manner. Five pictures were taken of each. The pill and capsule remained in the stomach 2 hours and disintegrated in the intestine in 2 hours.

*5% Time 2 Seconds*—Three subjects were used, with the first five pictures were taken. The capsule was in the stomach at the end of 5 hours and the pill disintegrated there. With the second subject nine pictures were taken. The capsule was intact in the stomach at the end of 9 hours and the pill disintegrated there in 7 hours. The third subject had two pictures taken. Both the pill and capsule were out of the stomach in 1 hour, and disintegrated in the intestine sometime in the second hour.

The results of these experiments show that the time of disintegration does not vary inversely with the length of immersion, as Cooper and Dyer have stated. They used the artificial pancreatic digestion method of testing and this may be the cause for the results they report.

The above experiments also show that several of the other early investigators were using too strong a solution of formaldehyde, thus producing a pill or capsule

which would pass through the digestive tract without disintegration. A considerable variation was noted in the time that was required for the pill and capsule to leave the stomach. In one subject, it was noted that the pill and capsule would remain in the stomach after a meal had passed through it. This condition seemed to be normal for this individual as the same results were obtained in three different experiments.

A formaldehyde concentration of 10 per cent and an immersion time of 5 seconds was considered to be the best method. This gave a disintegration in the upper intestine, which is usually desirable. If further penetration is desired, the 10- or 15-second immersion would be better.

We do not believe that the gelatin coating, formaldehyde treated, would be ideal for commercial products because of the mechanical difficulties which would develop. The method could be used successfully, however, by the pharmacist who may have an occasional call for a small number of specially prepared capsules. No extra equipment is necessary and the product, when dry, is not unsightly. The pharmacist must be careful that the capsules are well sealed or the contents are in some danger of becoming wet with the formaldehyde solution.

#### BIBLIOGRAPHY

- (1) Hausmann, D. R. Patent No. 85807 (Aug. 1895)
- (2) Rumpel, D. R., Patent No. 167318 (Oct. 1904)
- (3) Smith, cited by Cook *Am. J. Pharm.*, 86 (1914), 185
- (4) Ballenger and Elder, *Jour. A. M. A.*, 62 (1914), 197
- (5) DeLanney, *The Military Surgeon*, 35 (1914), 320
- (6) Scoville, *Southern Pharm. J.*, 7 (1915), 745
- (7) Scoville, *Jour. A. Ph. A.*, 7 (1918), 363
- (8) Cooper and Dyer Textbook—"Dispensing for Pharmaceutical Students"

COLLEGE OF PHARMACY,  
UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA

---

#### A PROPOSED FORMULA FOR BELLADONNA OINTMENT \*

BY C. O. LEE AND H. C. HOCH <sup>1</sup>

Therapeutically, ointment of belladonna seems to have, for the most part, justified the claims made for it. Pharmaceutically, however, many complaints have been made about the present official formula. Chief among these are

1. That it stains due to the presence of chlorophyll in the pilular extract.
2. It is difficult to rub the extract smooth previous to incorporation in the base. This may be due, in part, to the character and quality of the extract.
3. The finished product is too sticky.

Believing that it should be possible to prepare a satisfactory belladonna ointment free from the objections enumerated, prompted this study.

---

\* Section on Practical Pharmacy and Dispensing, Madison meeting, 1933.

<sup>1</sup> Professor of Pharmacognosy, School of Pharmacy, Medical College of the State of South Carolina, Charleston. Graduate Student, School of Pharmacy, Purdue University.

## PILULAR EXTRACT OF BELLADONNA IN VARIOUS OINTMENT BASES

Nine ointments composed of the same amount of pilular extract of belladonna were prepared, using as many different bases with respect to composition or proportions of the various ingredients. The procedure consisted in rubbing the extract to a smooth paste with the alcohol and incorporating it in the fats, after the manner usually prescribed.

These ointments were prepared and studied under varying temperature conditions, for purposes of comparing consistency and keeping properties. For this study samples of the ointments were subjected to summer heat (room temperature), oven heat at 35° C and to the electric refrigerator.

These ointments and their formulas are given in Table I following.

TABLE I

Formula Amounts in Gm	1 <sup>a</sup>	2 <sup>b</sup>	3 <sup>c</sup>	4	5	6	7	8	9
Extract belladonna pilular	10	10	10	10	10	10	10	10	10
Alcohol, dilute	5	5	10	5	5	5	5		
Wool fat, anhydrous	30	30	20						
Lard, benzoated	55		60						
Wax, yellow		5							
Petrolatum		50							
Purdue base <sup>d</sup>				85				85	85
Bibbins' base <sup>d</sup>					85				
Lascoff base <sup>d</sup>						85			
B P (1932) base <sup>d</sup>							85		
Magnesium stearate <sup>e</sup>								5	
Oleic acid									5

<sup>a</sup> U S P IX formula

<sup>b</sup> U S P X formula

<sup>c</sup> B P (1914) formula

<sup>d</sup> See Table II for the composition of these bases

<sup>e</sup> A saturated solution in dilute alcohol used

*Comments*—Of the formulas in Table I, No. 1 had to be rejected because it was too thin. This may have been due, in part at least, to the quality of the lard. Formula No. 3 of about the same composition and consistency was also discarded early in the study. Number 5, made with the Bibbins' base was of good consistency but a little sticky. Compared to this, the Lascoff base made ointment No. 6 even more sticky than No. 5. This stickiness is attributed to the presence of proportionately larger amounts of wool fat in the bases, since formulas Nos. 4 and 7 were free from this objection. We do not regard stickiness, such as these showed, a serious fault.

The use of magnesium stearate in No. 8 did not indicate any improvement over the other formulas. In Formula 9, the oleic acid not being miscible with the extract, made it impossible to get a smooth ointment.

In Table II, following, is given the composition of the bases used in making four of the ointments in Table I. These have all been considered and tried by various members of the Revision Committee of the Pharmacopœia, XI (Sub-Com 13, Bull. 13).



TABLE II

Constituents	Purdue	Ointment Bases		B P (1932)
		Bibbins	Lascoff	
Wool fat	5	15	20	5
White wax	5	10	15	
White petrolatum	90	75	65	85
Paraffin				10

Each is prepared by fusing the ingredients upon a water bath and stirring just enough, while cooling to insure thorough mixing

#### FLUIDEXTRACT OF BELLADONNA IN BELLADONNA OINTMENTS

Since there is the problem of getting a smooth paste with the extract of belladonna and the alcohol, as prescribed in the official formula, it was thought that this trouble might be eliminated by starting with the proper amount of the fluid-extract as in the B P (1914). A number of ointments were therefore prepared, using fluidextract of belladonna root instead of the extract as officially prescribed. These are shown in Table III, in which the formulas are given.

TABLE III

Formula Ingredients in Gm	10	11	12	13	14
Fluidextract belladonna root	30	30	30	30	30
Purdue base <sup>1</sup>	90	90	90	90	89
Magnesium stearate				01	
Oleic acid					1

<sup>1</sup> See Table II for formula

*Procedure*—The methods of making are somewhat different for each and will be given separately

In No. 10, the fluidextract was evaporated, on a water-bath, to 10 Gm, cooled and incorporated in the base in the usual way. For No. 11, the fluidextract was evaporated as for No. 10, the base was then melted and added to the concentrated fluidextract and stirred until congealed. In Formula 12, the concentrated fluid-extract was added to the melted base and the mixture stirred while congealing. In Formula 13, the magnesium stearate was added to the fluidextract previous to concentrating the latter. To this the melted base was added gradually with stirring until it congealed. For No. 14, the fluidextract and oleic acid were heated on the water-bath until reduced to 11 Gm. After the residue had cooled, the base was incorporated.

*Comments*—In preparing this group of ointments, it was observed that when the concentrated fluidextract was incorporated in the cold base, as for ointment 10, droplets appeared in the finished product. These did not appear when the base was melted, previous to mixing it with the concentrated fluidextract, as was done with ointments 11 and 12.

The addition of magnesium stearate in ointment 13 did not seem to alter the appearance of the finished ointment. The use of oleic acid did not seem to cause the trouble in ointment 14 that it did in ointment 9, perhaps due to the use of heat in making the former.

The question as to whether the use of magnesium oleate and oleic acid in

these ointments affected the alkaloids present will have to be determined by further experimentation

Finally there is this to be said for this group of ointments 1, the question of getting a smooth ointment was entirely solved, 2, the low lanolin content of Purdue base yielded ointments free from the stickiness so often observed, 3, the use of belladonna root, instead of the highly colored extract, eliminated the undesirable staining properties of the present official ointment, and 4, the process of making is simple and comparatively easy

#### OINTMENT OF BELLADONNA IN A CHOLESTERIN-CONTAINING BASE

The presence of cholesterol in small amounts in petrolatum and other bases and base constituents such as wax, are reputed to greatly increase the water holding property of the base Two bases, Nos 15 and 16, were, therefore, prepared each containing 1.5% cholesterol The formulas were

Number 15—Petrolatum, white	98.5 Gm
Cholesterol	1.5 Gm

Number 16—Petrolatum	93.75 Gm
White wax	4.75 Gm
Cholesterol	1.50 Gm

Each was prepared by melting the ingredients upon a water-bath and stirring until cool

When tested for their water-absorbing properties, Formula 15 easily took up 30 per cent of water which was not removed by melting the base upon a water-bath It was found that Formula 16 took up somewhat more water, indicating that wax increases the water-holding property of such mixtures

In view of the observations made with bases 15 and 16, it was decided to prepare an ointment of belladonna from fluidextract of belladonna root and base No 16 The ointment which resulted was free from stickiness, of splendid consistency, had good spreading properties and was not difficult to prepare When assayed according to the method of Deal, *J A O A C*, 15 (1932), 442-446, the results were found to check favorably with those of an equivalent amount of the fluidextract as a control

We, therefore, wish to suggest that we believe that the following formula for belladonna ointment would make a desirable preparation It is free from most of the objectionable features of the present official formula The proposed formula is as follows

Fluidextract belladonna root	28.00 cc
Cholesterol	1.50 Gm
White wax	5.00 Gm
White petrolatum	83.50 Gm

*Procedure*—Concentrate the fluidextract upon a water-bath to 10 Gm Add to this the melted base, slowly and with stirring, until cool

PRESCRIPTION ACCURACY AS SHOWN BY STATE BOARD OF  
PHARMACY EXAMINATIONS—A PRELIMINARY STUDY \*

BY ROBERT L SWAIN

As a member of the Committee on Prescription Tolerances, appointed by President W Bruce Philip, of the AMERICAN PHARMACEUTICAL ASSOCIATION, I requested the Maryland Board of Pharmacy to cooperate by turning over to me certain prescriptions compounded by applicants appearing before the Board on June 5th Two prescriptions constitute the basis for this preliminary report

- |     |                             |        |      |
|-----|-----------------------------|--------|------|
| (a) | Sodium Bicarbonate          |        |      |
|     | Charcoal Powd    āā         | grains | lxxv |
|     | To be made into ten powders |        |      |
| (b) | Quinine Sulphate            |        |      |
|     | Aloes Pulv    āā            | grains | x    |
|     | To be made into ten pills   |        |      |

The various powders and pills, turned in by thirty-five applicants for the practical examination, were carefully checked and weighed upon analytic balances in the Bureau of Chemistry of the Maryland State Department of Health The results show the weight of each powder or pill turned in by each applicant This permits a full consideration of the work done by each compounder, including the variations existing between the individual powders and pills in each instance It was thought that such a procedure would strongly indicate the skill and accuracy with which the prescriptions were compounded

Simply as an effort to present a fair opinion upon the results obtained, eleven of the prescriptions for powders were accepted as satisfactory The basis for acceptance was more or less indefinite, and depended largely upon my own conception of what degree of accuracy should prevail However, before arriving at the final conclusion, I gave careful scrutiny to the entire number of powders, and simply selected the number that appeared to me to be more uniform in weight, more closely conforming to the average weight, and showed less deviation in weight as between individual powders Twenty-four of the prescriptions were not considered acceptable when judged in the same manner It should be added that no information is available regarding the methods of division The results in some cases were so uniform as to indicate that each powder was weighed As a rule, however, the facts suggested division in the usual manner

I should like to say here that some very valuable studies of prescription compounding have been made by Prof Marvin J Andrews of the School of Pharmacy, University of Maryland Some of his findings have been published, or will be published in the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION He has worked out the average standard deviation for several frequently met with prescriptions I shall not discuss his procedure, as it is a bit complicated and exceedingly laborious, but I suggest that his results be carefully studied as it is a constructive and fundamental piece of work Applying Professor Andrew's conclusions to the powder prescription discussed here, it is shown that each powder should contain not less than 13.92 grains

---

\* Section on Practical Pharmacy and Dispensing A PH A., Madison meeting, 1933

The prescriptions for pills were more consistently satisfactory than the powders. Only four were regarded as altogether unsatisfactory. I might add that the basis for acceptance was almost entirely uniformity in weight. The excipient was not specified, and this made it impossible to consider difference in weight as between different compounders.

## PILLS CONSIDERED SATISFACTORY

No 1	2 70	2 70	2 71	2 82	2 96	2 98	3 12	3 13	3 26
No 2	3 64	3 70	3 77	3 78	3 87	4 00	4 07	4 07	4 26
No 3	2 10	2 42	2 45	2 69	2 78	2 79	2 82	2 89	3 01
No 4	2 25	2 28	2 47	2 50	2 68	2 68	2 76	2 78	2 93
No 6	2 33	2 42	2 47	2 58	2 62	2 67	2 79	2 79	2 84
No 8	2 42	2 48	2 50	2 61	2 67	2 82	2 98	3 01	3 04
No 17	3 40	3 66	3 70	3 86	3 89	3 90	4 04	4 21	4 21
No 20	2 39	2 50	2 59	2 59	2 62	3 64	2 68	2 81	2 87
No 23	2 19	2 48	2 58	2 75	2 82	2 81	2 90	2 99	3 10
No 24	2 18	2 24	2 31	2 39	2 41	2 44	2 44	2 70	2 72
No 26	2 38	2 70	2 76	2 78	2 79	2 93	2 90	3 01	3 16
No 28	2 07	2 08	2 21	2 23	2 30	2 32	2 35	2 38	2 49
No 29	1 74	2 24	2 30	2 44	2 45	2 49	2 56	2 65	2 69
No 30	2 18	2 22	2 28	2 31	2 33	2 35	2 41	2 50	2 53
No 31	3 02	3 07	3 21	3 47	3 50	3 60	3 64	3 72	3 78
No 32	2 38	2 47	2 59	2 65	2 70	2 73	2 76	2 78	2 93
No 34	2 13	2 16	2 21	2 34	2 45	2 50	2 56	2 56	2 59
No 37	2 56	2 72	2 80	2 96	3 13	3 24	3 26	3 38	3 53
No 40	2 10	2 16	2 22	2 25	2 25	2 30	2 41	2 41	2 95
No 42	2 55	2 55	2 59	2 72	2 72	2 72	2 78	2 93	3 12
No 44	2 04	2 16	2 36	2 42	2 42	2 50	2 56	2 70	3 09
No 46	2 75	2 89	2 90	2 99	3 01	3 02	3 02	3 04	3 07
No 47	3 41	3 07	3 32	3 36	3 36	3 41	3 46	3 53	3 80
No 48	2 62	2 90	2 96	3 13	3 15	3 35	3 36	3 38	3 49
No 50	2 42	2 62	2 62	2 78	2 81	2 82	2 92	2 93	2 99
No 51	3 05	3 27	3 29	3 29	3 39	3 44	4 52	3 90	3 93
No 52	2 73	2 85	2 92	3 06	3 09	3 11	3 18	3 32	3 39
No 53	1 93	1 93	2 05	2 14	2 19	2 21	2 21	2 22	2 24
No 56	3 10	3 26	3 39	3 53	3 53	3 73	3 73	3 90	3 92
No 58	2 61	2 65	2 65	2 85	2 90	2 96	2 98	3 09	3 33
No 60	2 67	2 85	2 90	2 93	2 96	3 07	3 09	3 15	3 19

## PILLS CONSIDERED UNSATISFACTORY

No 5	1 43	1 43	1 50	1 54	1 54	1 59	1 61	1 68	1 96
No 25	1 81	1 81	1 87	1 90	1 98	2 02	2 07	2 07	2 21
No 41	1 42	1 45	1 50	1 57	1 57	1 62	1 65	1 67	1 79
No 57	1 16	1 23	1 23	1 26	1 28	1 31	1 40	1 40	1 57

I am presenting this report as a preliminary study. I do not know just how valuable this data may prove to be in arriving at a conclusion as to what degree of accuracy should prevail in prescription practice, but I am certain it will be of suggestive value. In fact, a full study of the whole field of prescription compounding may well prove that no arbitrary standard can be set up. At any rate, the study will be continued until definite and authoritative conclusions are possible.

## POWDERS CONSIDERED SATISFACTORY

No 3	11 84	12 66	13 16	13 33	13 46	13 89	15 97	16 28	16 52	18 73
No 8	13 76	14 06	14 34	14 41	14 47	14 55	14 65	14 76	14 95	15 21
No 17	15 60	15 71	15 85	16 25	16 66	16 70	16 77	16 77	16 79	16 80
No 34	13 29	14 10	14 59	14 50	14 62	14 79	15 25	15 27	15 50	16 48
No 42	12 56	14 04	14 52	14 88	15 00	15 01	15 01	15 50	15 69	16 71
No 46	12 43	12 94	15 07	15 20	15 45	15 79	16 61	16 77	16 97	17 05
No 47	14 01	14 45	14 56	14 85	15 11	15 15	15 28	15 41	15 45	16 86
No 48	12 15	12 41	13 57	13 36	13 87	13 89	13 98	14 12	15 27	15 39
No 50	12 76	13 61	13 65	13 87	14 07	14 52	15 59	15 94	16 49	17 49
No 51	13 18	13 27	13 87	14 29	14 98	15 00	15 30	16 13	16 52	16 90
No 53	14 49	14 59	14 92	15 12	15 33	15 35	15 35	15 56	15 70	17 00

## POWDERS CONSIDERED UNSATISFACTORY

No 1	9 06	9 66	13 25	14 48	15 54	16 06	16 25	16 45	16 59	18 78
No 2	11 45	12 51	12 84	13 96	14 07	15 19	15 30	15 36	16 15	16 16
No 4	14 78	16 06	16 56	16 90	17 58	17 85	18 01	18 18	20 41	26 38
No 5	11 67	12 02	12 91	14 43	14 60	15 45	15 62	16 02	16 56	17 26
No 6	11 70	12 01	12 99	13 01	13 24	13 43	13 61	13 95	14 04	15 06
No 20	11 49	12 68	13 50	13 92	14 17	14 96	15 65	15 80	16 43	17 85
No 23	10 33	10 75	10 88	13 05	13 21	14 56	14 58	15 35	19 15	19 36
No 24	8 93	10 86	12 45	12 52	13 46	15 32	15 45	16 25	16 88	17 01
No 25	10 65	11 92	12 11	12 49	13 01	13 32	15 08	15 38	15 73	15 73
No 26	8 31	11 56	12 52	13 17	14 80	15 37	15 60	17 07	17 45	19 32
No 28	10 31	11 82	12 06	12 19	12 82	13 19	13 40	13 71	14 21	14 56
No 29	10 65	12 21	12 86	13 65	15 19	15 70	16 00	16 32	16 51	16 79
No 30	10 15	10 31	10 74	11 06	11 46	11 68	11 92	12 46	12 60	13 27
No 31	11 54	12 25	12 97	13 40	13 84	14 35	14 44	15 09	15 27	15 87
No 32	9 98	11 32	11 35	11 71	12 19	12 99	13 43	13 55	13 71	14 78
No 37	12 04	12 73	13 38	13 65	13 76	14 05	14 20	14 38	14 90	15 41
No 40	11 64	12 20	12 90	13 10	13 27	13 35	13 70	14 01	14 23	15 19
No 41	10 11	10 95	13 00	13 04	13 34	13 83	14 14	14 30	15 33	15 35
No 44	10 18	11 00	11 82	12 45	12 60	13 75	14 07	14 48	14 61	15 82
No 52	12 59	12 78	12 80	13 64	14 74	15 56	15 56	16 15	16 67	17 67
No 56	11 64	12 57	12 65	12 80	12 83	12 93	13 10	13 68	14 36	15 21
No 57	12 08	12 76	12 91	13 34	13 45	13 58	14 06	14 12	14 48	15 43
No 58	10 19	11 94	12 18	12 82	13 05	14 08	15 94	16 80	16 99	18 90
No 60	12 35	13 05	13 59	14 66	14 85	15 29	15 35	15 84	16 05	17 61

## ABSTRACT OF DISCUSSION

E D Stanley inquired whether accuracy had any relation to the ingredients. The author hoped that greater accuracy would be obtained with more potent ingredients, he stated that there is unlimited possibility of deviation. His conclusions were based on the weight of the finished product. In reply to a question, the author stated that he has been making a study of the legal aspects of such deviations, he cited a Maine case where the work had been carelessly done. The Court reviewed the various methods of weighing powders and observed that the customary method of the profession may be wrong. Hence it is not merely an academic question, the most accurate method is that of weighing the individual ingredients.

D F Jones asked if the error, in many cases, might not be attributable to trituration. Mr Swam expressed his interest in the work of Mr Andrews, the work is done with uniform apparatus and under uniform conditions, none of the variables of the pharmacy are present, this work is to determine tolerance under ideal as well as under adverse or average conditions, in the laboratory.

I A Becker, Rowland Jones, Marvin Andrews and L W Rising discussed balances and graduates, other discussions related to the variance in therapeutic results due to variation in weights and measures.

## BINDING UP A WOUND

BY FRED B. KILMER

(Continued from page 1126)

The name of a Glasgow surgeon, Joseph Lister, is associated with the inception of antiseptic surgery. Lister was not the creator of antiseptics, nor the inventor of antiseptic wound dressing. He merely organized and applied the researches which had gone before. His famous carbolic dressings hark back to the tar and pitch of ancient Egypt. Antiseptic applications to wounds had been made sporadically through the centuries. Lister erected them into a system. Lister impregnated lint, bandages, cotton and gauze with antiseptics, and applied them to wounds. Suppuration was banished and the wounds healed. Simple, but wonderfully effective. Even under the now-considered crude and cumbersome methods of Listerism, the mortality in major operations at once dropped from a range of 45-65 per cent to the then marvelously low figure of 6 per cent. Truly a surgical revolution.

Lister's measures were in essence methods of cleanliness. The antiseptics were cleansing agents, "angels of cleanliness." Infecting organisms, bacteria or germs present on the hands, instruments or skin of the patient were destroyed and their growth was prevented. Wounds healed rapidly—by first intention. No inflammation—no pus—no gangrene—no infection.

This was a wild idea, according to Lister's fellow surgeons. Nobody believed it possible, except Lister's wife, who helped him to do it. Lister devised a system of dressings and methods that turned the surgical world completely around. He sprayed the air with a carbolic solution that set everybody choking and coughing. This he soon abandoned as unnecessary. He dipped lint and gauze in solutions of boracic acid, carbolic acid, corrosive sublimate and other germ-destroying agents, and covered the wounds with them. Thus, in Lister's kitchen, with the aid of Lady Lister, a wash tub and a clothes wringer, began the great system of antiseptic pads, bandages, cottons, gauzes and dressings which later played so large a part in wound healing.

The idea, however, did not go over easily. Lister's English colleagues fought hard against the methods. French surgeons took to it more kindly, but not with rapidity. The German surgeons adopted it enthusiastically, and added iodoform, salicylic acid, mercury compounds and a dozen other antiseptic chemicals. The American surgeons held aloof. A few of them went overseas and came back convinced. For the most part, the profession in our land for a time rigidly ignored, then took it up, and carried it forward eagerly.

As the years went on, Lister, weakening his solutions, modified his methods. While the foundation principles of Listerism were not changed, and still remain, the pads, bandages and dressings were to a degree modified and changed from *antiseptic* to *aseptic*.

If we study the meaning of a few words, perhaps we shall better understand the change.

*Antiseptic*—Anti—against, sepsis—poison, an antiseptic dressing contains a substance which will either destroy or prevent the growth of a living organism (a germ) which will produce infection or poison.

*Aseptic*—A—free from, sepsis—poison, an aseptic dressing is one which is free from any living organism (germ) which will produce infection or poison

A *sterilized* dressing is one which by passing through some process (heating etc) which has destroyed any living organism (germ) is rendered sterile

One could take a bandage, dip it in a solution of carbolic acid—an antiseptic, wash away the carbolic acid, and there would remain an *aseptic or sterile* bandage

If we steamed, boiled or heated a bandage it would become *aseptic or sterile*

Thus Lister's antiseptic dressings in the course of time were transformed into *aseptic or sterile* dressings

Lister himself heated some of his dressings and made them sterile But he preferred to use dressings which were impregnated with antiseptics

The Continental surgeons still, to a considerable extent, use antiseptic dressings They have adopted many of the newer antiseptics American surgeons, in the larger part, employ aseptic material sterilized by heat (steam pressure)

In addition to the use of sterile or aseptic material in surgery, elaborate and somewhat complicated methods are employed in the sterilization of apparatus, instruments, the cleansing of the field of operation and of the hands and clothing of the operator, etc The objective is to keep out or destroy deleterious organisms and protect the wound from infection

First aid to the injured took orderly shape under Listerism First aid in its true aspect means that when a person is injured, and especially when the flesh is broken, the wounded part shall at once be covered with a suitable bandage to prevent further injury, and specifically to prevent the entrance of the germs of infection into the broken flesh Slowly the idea spread—at first in industry, where it was found that first-aid measures would reduce the extent of the injury, prevent infection, and result in a saving of money loss in wages, compensation, etc Many states in the Union now require that industries shall have at hand suitable bandages and dressings for the prompt application of first aid Railway and transportation lines also provide equipment, including bandages for the application of first aid In military practice every soldier carries attached to his belt a package of dressings for use on the battle-field

A feature of first-aid bandaging is the use of the famous triangular bandage Originating in the ancient use of the handkerchief in wound dressing, the modern triangular bandage was introduced in 1832 The renowned surgeon, Esmarch of Kiel, added the printing of illustrations upon the bandage showing its application It is now known as the Esmarch bandage It is used extensively in military and in lay first aid

First-aid outfits are supplied for factory, shop, home, automobile and transportation vehicles

The treatment and after-care of injuries, the administration of medicines, the diagnosis and treatment of disease are no part of first-aid work The first-aid worker covers the wound with a bandage and stops

When the present era of surgery arrived, the principal dressing materials in use were lint, non-absorbent cotton, muslin, linen and flannel bandages In a limited way these materials are still in use With the antiseptics of Lister and the later modification to asepsis, cotton was made absorbent Cheese cloth was converted into what we now term "absorbent" or "surgical" gauze Some years

prior to the World War absorbent paper in sheets was introduced under the name of "cellulose wadding" as a substitute for cotton. Paper tissue is absorbent, but it lacks the elasticity of cotton fibre. Paper has been spun into a thread and woven into a fabric. For mechanical uses, especially, adhesive masses have been spread upon paper fabrics. In recent times some of the newer fabrics, including rayon, crepes, elastic fabric of rubber and cotton, cellophane and metallic foils, have been brought into use. And at the present time we have cotton, gauze and paper made into sheets, pads, compresses, napkins, sponges, tampons, bandages and other forms without end. These are used in surgery, dentistry and in the shop and the household. In modern times the use of cotton, gauze and even adhesive plaster for toilet, household and mechanical purposes rivals and in some instances exceeds the consumption in surgery.

The rapid introduction of the Listerian dressings and the present-day sterile or aseptic dressings has been due to the enterprise of the manufacturers, greatly aided by their distribution through the drug trade. Lister made his own dressings. Upon their acceptance in this country the hospitals undertook to make them for their own use. A few surgeons installed in their offices apparatus for impregnating gauze with antiseptics, machines for cutting and rolling bandages, etc.

The British and the U. S. Pharmacopœias recognize absorbent cotton. The British Pharmaceutical Code establishes standards for various gauzes and dressings under the designation "Carbasus." In several of the foreign Pharmacopœias absorbent cotton is official.

Hager's "Handbuch der Pharmaceutischen Praxis" contains a chapter on "Verbandstoffe" in which the preparation of surgical dressing material including cotton, gauze, bandages and ligatures is outlined, and instructions are given for their impregnation with antiseptics and sterilization. Illustrations of apparatus for the preparation of these materials are shown. In many pharmacies in Germany and Continental countries the preparation of these dressings is a prominent activity.

The pharmacist has been an important factor in this phase of the progress of surgery and surgical dressings. He has been the distributor. Through the agency of the retail druggist the surgeon in any remote corner of the land can obtain the type of dressing needed. Without the druggist's kindly aid, surgical progress would have been slow.

Rather lamentable is the fact that the pharmacist has been content to remain simply a distributor of surgical dressing material. For the most part, he has failed to make himself a factor in surgical progress. He left it to the manufacturer to fabricate and exploit new forms of dressings. He did not keep pace with the increased use of these materials stimulated by the great first-aid movements that have encompassed the land. He dispensed over the counter that which the buyer asked for, and let it go at that.

Such a condition still prevails. In the up-to-date drug store we see counters, show-cases and windows filled with cut-rate medicines returning little or no profit. On the other hand, bandages, cotton, gauze, wound dressings and first-aid materials which afford a fairly long range of profits are put under counters and in closets—out of sight. They are not shown, nor is their sale pushed. One druggist, when asked the reason for this custom, replied: "When customers come into my store I don't



want them to think about such unpleasant things as sickness, accidents or injuries " And so the exploitation of bandages, gauze, cotton, etc , is taboo

In taking this attitude, the druggist overlooks the fact that increased sale of this class of items would add to his reputation, prestige and profits They are in reality "home needs," "home necessities," capable of a greatly extended use While their use in caring for wounds and injuries is large, their use in the arts, the home, the shop and other walks of life is extending daily For absorbent gauze or so called "surgical gauze" there are a thousand uses in the ordinary paths of life entirely foreign to wound dressing Many times more absorbent cotton is being used in the household and shop than in wound treatment Beyond the medical and surgical uses of adhesive plaster lies a field of mechanical uses far exceeding all other forms of application, and seemingly unlimited The agency of the retail druggist in the distribution of these items for surgical use stands to his credit It is to be feared that he has not kept pace with their more modern uses He has in a great measure allowed the trade to slip over to the dry goods store, the hardware dealer and the knick-knack shop

The art of binding up a wound begins with primal man Through the ages it has developed slowly, following the changes in civilization and the advancement of the surgical art Certain forms of bandages and methods of application have been carried through the centuries The trend of modern surgical practice is toward the simplification of bandages and dressings The amount of material used per individual operation has notably decreased This is balanced by the increase in the number of operations performed

The embalmers and the barber surgeons were important factors in the development of surgical bandages The apothecary or pharmacist, either when merged with the medical art or when separated from it, has been a factor in the preparation and application of surgical dressings In modern times the rôle of the pharmacist is largely that of a distributor

---

## PUBLICITY AND THE PHARMACIST \*

BY ALICE-ESTHER GARVIN

The attitude of most pharmacists toward unfavorable publicity reminds me of the man who kept hitting himself on the head with a hammer because it felt so good when he stopped We have emerged from the Victorian and early Georgian period of overweening modesty, and it would seem not only feasible but absolutely essential that the present-day pharmacist seek favorable publicity not only for his profession in general, but also for himself The slogan, "Your pharmacist is more than a merchant" has been helpful, but we need more and more news about the individual druggist—about you men in this audience to-day As Byron so aptly said,

Words are things, and a small drop of ink  
Falling like dew, upon a thought, produces  
That which makes thousands, perhaps millions think,<sup>1</sup>

---

\* Section on Commercial Interests, A. P. A. Madison meeting, 1933

<sup>1</sup> Lecturer in English Connecticut College of Pharmacy, New Haven

and we want the public to think about us, and to know of our accomplishments and exploits

In the first place, we are living in a "hard-boiled" age. The reading public, with their senses dulled by a long period of disappointments, will not believe that the druggist is more than a merchant, nor that he is a professional man, nor that he is even a human being, unless these facts are brought forcibly and frequently to their attention through the medium of the most powerful force in the world—the columns of the public press. Let the attention of people be focused upon the important things being done in this workaday world by the local druggist, let them see his name, or his picture, or a photograph of his store. *No one* may be successful to-day without publicity, and certainly proof of that may be found in the President's campaign for national recovery, every daily paper in the country carries a news story from Washington, and, while I do not mean to imply that the average druggist means as much to a city editor as members of the Cabinet (even *I* am not so impertinent as to think that) *I do* mean that the average druggist may be a source of benefit to his profession, to himself, and to the circulation of the local paper, if he is willing to stay awake on sentry duty.

Every newspaperman is looking for news. I'm sure you've all heard the little poem addressed to them

So here's to the gallant reporters!  
The boys with the pencils and pads—  
Those calm undisturbable, cool, imperturbable, nervy, inquisitive lads  
Each time that we pick up a paper,  
Their marvelous deeds we should bless—  
Those bold, reprehensible, brave, indispensable, sensible lads of the Press "

I think it is not fallacious to assume, in this connection, that a professional man is stronger meat for headlines than one of the prehistoric Forgotten Men, and so, if a druggist is convicted of a law violation, or beats his wife, or substitutes one preparation for another, or is arrested for speeding, or is out of antitoxin and the child dies, or leaves his store "uncovered" while he is attending a convention or playing golf, or attends a stag party where the entertainment may be more or less questionable, the daily press may carry a glaring headline which will damn him seriously and permanently in the eyes of his customers. He suffers, his family suffers, and the profession of pharmacy is kicked down a few more stairs. If one druggist, or his clerk, fills a prescription incorrectly with dire results for the patient, the inevitable result will be a news item of irreparable damage to the man's reputation, a loss of public confidence in the store, and the maligning of the entire profession. We are a nation of generalizers. If a pharmacist is careless in the compounding of *one* prescription, (we think) he must be equally careless in the compounding of *all* prescriptions, and, by the same token, if *one* pharmacist is careless in the compounding of a prescription, *all* pharmacists must be careless. The average reader knows little of syllogisms.

To offset débâcles of this type, we need publicity of a favorable nature, I wish it were possible to have in every paper, every day, an item about a pharmacist or pharmacy, so that we might gradually bring about a recognition of the druggist's value to his community. For example, this has been a legislative year, and many laws of benefit to public health have been enacted, through the efforts of the phar-

macists, in the several states. These should have been bruted about until every reader of every newspaper in every city, town and village was deeply cognizant of the work being done by his fellow townsmen. Copies of addresses made by speakers at conventions, or addresses made by local pharmacists, should be sent to the newspapers with a release-for-publication date, many pharmacists are doing research work in their laboratories—work of interest and value to the public—work that would make fine news stories, let the local papers be given an opportunity to tell them. Often a druggist is elected to public office, not necessarily concomitant to his profession, but possibly a civic office, or one in a club, fraternity or society. This would be of interest to his customers, as well as to the reading public, and might assure the readers that the pharmacist is a man of more or less prestige, socially or politically—that he is more versatile than would be indicated by his rapidity in filling capsules or making medicinal compounds. Not infrequently he may be honored by a college, or by a city, state or national organization, and, in that case, there should certainly be a news item, with headlines. Local and state organization meetings, banquets, *et al*, should receive notice, as also outstanding articles by pharmacists that seem worthy of credit. The public should know about druggists, and should realize the qualities of those men whom they meet so impersonally every day. And I wish to state at this time that the newspaper will *not* know about you unless you yourself give the item. Most of us think the other fellow will take of publicity, but that other fellow is waiting for some one else to write the item or call the paper, and so a fine opportunity for favorable notice is lost. We have so much temerity in other respects that it seems almost incredible for us to be diffident in the matter of talking about ourselves to newspapermen, and it is this very excess of modesty that prevents us from having our names and our accomplishments before the eyes of the people who read.

At this point I wish to insert a plea to all men in the profession, urging them to write for pharmaceutical journals. There are scores of fine trade magazines in the states, with hundreds of thousands of readers. In a few cases, the editors may seek manuscripts, but they are eager to receive papers on any new or original ideas that you may have. It is a little old-fashioned to subscribe to the theory that if a man built a better mouse trap than his neighbor, the world would beat a track to his door. Nowadays that same mouse trap would require a full-page advertisement in the *Saturday Evening Post*, and two half hours a week on the National Broadcasting Company, with Rudy Vallee, Eddie Cantor, Burns and Allen, and Graham McNamee touting its superiority over all other mouse traps in the field. And so to-day we must rely upon our own initiative, if you have an idea for an article, don't wait for the editor to ask you for it—send it off to him at once before some one else writes, and receives credit for, the same story, nowadays editors aren't beating tracks to any one's door, possibly because they haven't any mice in the larder.

To return to the newspapers—one of the most important and widely read sections of the paper is the one devoted to human interest stories. Sometimes these are feature stories, while in other publications they are listed under news items. I refer to such articles as those describing a druggist, who, during the economic cataclysm, filled many prescriptions for the poor, and charged them nothing, the druggist who saved a life by administering the proper antidote, the druggist who

is interested in athletics and has donated a silver cup to the athletic association of the local high school, to the one who has prevented a suicide, to the one who has rushed an emergency case to the hospital in his own car, to the one who, for many years, has been quietly aiding families in need of charity. These human interest stories are occurring every day, but they do not reach the newspapers because the "other fellow" has forgotten. It is said that "names make the news," pharmacists have good names, and make splendid material for copy, but an inherent modesty prevents them from notifying a paper.

At this point you are saying, "We have a publicity committee that takes care of our news items, why should we take the time to call up a newspaper office, or to visit a city editor, or to write an article and send it to a paper?" I will omit the axion for adolescents, "If you wish a thing well done, you must do it yourself," and quote a sentence written by Francis Bacon in 1600, over three hundred years ago. "I hold that every man is a debtor to his profession, from which as men do, of course, seek to receive countenance and profit, so ought they of duty to endeavor by way of amends to be a help and ornament thereunto." If every pharmacist in the United States were willing to be a help and ornament to his profession, if every pharmacist even once a year sent an article to the paper, or to the chairman of the publicity committee, the accumulation of favorable publicity would be far-reaching. It is the dilatory leaving of news to some one else that is so fatal to our aims.

Naturally, men not conversant with what is quaintly termed the "newspaper game" may be affronted at the occasional refusal, by a city editor or reporter, to accept an article submitted. We should remember that in the highly trained mind of the newspaperman there is a sharply defined line of demarcation between a news item and a bit of commercial advertising. Surely we know that a newspaper is kept alive by its advertising, and that advertising should be paid for. The managing editor of the *New Haven Register* said to me not long ago, when, as a matter of fact, I was seeking some publicity for the Connecticut druggists, "Druggists would resent having anyone come into the store, take merchandise from the shelves and walk off without paying for it, wouldn't they? Well, the pharmacist sells drugs and chemicals, and the newspapers sell space, and in both cases, legitimate service ought to be paid for." I quote that to lead up to the difference between *News* and *Advertising*. Advance notice of a banquet is *News*, a one-cent sale is *Advertising*, election to a civic office is *News*, advance notice of a sale of Christmas cards is *Advertising*, prevention of a suicide is *News*, the opening of a new store is *Advertising*. In the last analysis, I suppose we cannot hope to get something for nothing, my great personal hope is that we may get something for something. In some newspapers, publicity is gladly given, and even sought, for those pharmacists who have a daily advertisement in that paper. In others, any attempt to "steal" space is frowned upon. In the small town, the druggist may be his own press agent, and should know and respect the judgment of the men who conduct the papers, but he should frequently submit news about himself and his store. In the larger cities there is an almost insurmountable obstacle because of the wide variation of interests there, a reporter doesn't have to walk from house to house looking for something to happen in Los Angeles, Chicago or New York, and he may be loath to publicize the accomplishments of a mere druggist. How-

ever, the grade A papers of the country have, for the past five years, shown a tendency to minimize the glaring and sordid stories of murder, crime and sex, and to give more space to scientific news, that is, they wish to be social, rather than anti-social. This fact is in the pharmacists' favor

I seem to be taking a most circuitous route in order to accomplish the end for which this paper was written. Most of you are probably asking, "So what?" as I reach the point, as you think I have said nothing which you did not previously know. It is axiomatically simple to be destructive in criticism, and gigantically difficult to offer, in this the Era of Codes, some constructive ideas which are workable and practicable. In outline form, the ones I should like to suggest are

1 Favorable publicity is as essential for a successful pharmacist as national advertising is for the products he sells

2 Newspapermen are always looking for news, and if you, or one of your fellow pharmacists, have done anything worthy of note, the local paper will be glad to print the item, but you should not wait for some one else to notify the press

3 Unfavorable publicity cannot be curbed. "The evil that men do lives after them, the good is oft interr'd with their bones." Druggists are human, after all, and will, therefore, continue to furnish fodder for the rocking chair brigade. But these unfavorable articles may be offset by a great number of favorable ones

4 Send articles to your favorite pharmaceutical journals. These may not necessarily be of interest to the public, but they will be of interest and benefit to your fellow workers

5 Every life, no matter how relatively simple, is a story, you, as pharmacists, have on your threshold the material for innumerable stories, if you choose to think of yourself as interpreter or motivating force, if you realize what an important entity you are in the great game of life

6 In the large cities, there should be an active publicity committee, a sort of central clearing house, the chief agent of which might be a man who understands the drug business, and also knows advertising and newspaper work. There, with a unit effort toward combating the chain, toward high grade, expert service of a high standard, the committee, with this thought in mind, should be held responsible for the actual publication of favorable articles. I do not mean stealing space, but the writing of items of real interest to the readers, and not alone of personal benefit to the individual druggist. Every druggist should get in touch with this agent, who might serve as a liaison officer between the pharmacists and the newspapers

7 Names make the news. Determine to have your name, or your store or your profession, make some fine news as quickly as possible. May I suggest as a motto for the 1933-1934 pharmacist the following—

What rage for fame attends both great and small!  
Better be damned than not mentioned at all "

# THE DEPARTMENT OF THE AMERICAN ASSOCIATION OF COLLEGES OF PHARMACY

C B JORDAN—CHAIRMAN OF EXECUTIVE COMMITTEE A A C P EDITOR OF THIS  
DEPARTMENT

The following paper by Dr Edward Kremers entitled, 'Introductory Lecture to a Course in History of Pharmacy,' was presented at the Madison meeting of the American Association of Colleges of Pharmacy Its importance from the standpoint of history was at once recognized and the Association voted that the paper should be printed in this Section of the JOURNAL OF THE A P H A in order to give a wider distribution It is with great pleasure that the Editor presents this historical material by Dr Kremers"—C B JORDAN, *Editor*

## INTRODUCTORY LECTURE TO A COURSE IN HISTORY OF PHARMACY

BY EDWARD KREMERS, UNIVERSITY OF WISCONSIN

Frequently I have been asked to write a history of pharmacy Quite aside of personal limitations and the want of necessary leisure, it has seemed to me that we are not prepared to write a history What we are sadly in need of is detail work which may serve as building material for a future historian True we have several valuable treatises that either style themselves history or are regarded as such Even the ponderous tome of Schelenz, a valuable reference work because of the twenty-five thousand primes in its index, is not a history in the true sense History is not a chronicle of events arranged according to centuries, any more than science is a collection of facts, no matter how well arranged

Having refused again and again to attempt to write a history of pharmacy, I was happy to respond to a request made by the Chairman of our Executive Committee to read a paper on the "Teaching of the History of Pharmacy," moreover to present such a paper here in Madison where it might be supplemented with illustrative material Even before the request came to me, I had jotted down certain ideas which, it seemed, might serve as an introductory lecture to a course on the History of Pharmacy These notes I have supplemented for this occasion with the briefest possible outline of a year's course If after having presented to you this subject you are sufficiently interested therein to want to know about particular details I shall be happy indeed to discuss these with you, either individually or collectively, using the material here exhibited for the purpose of illustration The student of history of medicine is apt to regard pharmacy as an offshoot of the practice of medicine Indeed, there are representatives of the calling to-day who look upon it as one of the many specialized departments of medicine On one occasion, LaWall appears to have taken satisfaction in telling the physicians of Philadelphia that pharmacy came first, hence medicine developed out of it Friendly rivalry may be tolerated even in history, but the serious discussion concerning the priority of medicine over pharmacy, or vice versa, seems to be about as futile as the quarrel which was first, the hen or the egg The fact is that history teaches us that both had a common origin, *viz*, in the animal instincts of primitive man

Wild animals to-day bathe their wounds in water or cover them with a layer of

1270

mud Domesticated dogs lick their wounds, other animals relieve internal disorders by fasting The "Heilinstinkt" manifests itself in a variety of ways When Kristin, the daughter of Lavrans, is described by Sigrid Undset as licking the pus that prevents her infant from opening his eyes, she practices that animal instinct referred to As hunter and warrior, primitive man bore most of the wounds, but it was primitive woman, as wife and mother, who acted as nurse to her husband and child

Wounds, also skin affections due to insects, were external and, while not always curable, did not partake of the element of the mysterious The cause was readily apparent The remedy, *viz*, washing, or the application of a poultice of green leaves or comminuted fresh bark, or the application of an animal fat, was no more mysterious It was different with internal disorders In nature that surrounded man on all sides, he recognized evil as well as beneficent forces They were his superiors To the beneficent he rendered thank offerings To the evil ones he rendered offerings of atonement, he even fought them Nature gave him food and drink, the givers of which man personified, it also sent the destructive lightning which likewise he personified The evil demon sent his equally evil spirits to plague man in the form of disease Hence, disease was cured by driving out the evil spirit

If in the first step of the development of primitive medicine and pharmacy the methods employed were natural, the second step in the development of combating disease partook of the supernatural The original healer, in the person of wife and mother, was supplemented by a person of superior attainment, the priest and medicine man Though appealing to the religious beliefs of the people, the new healer did not discard the earlier material practices of mankind, but extended his observations not only with regard to man's physical defects, but also with regard to the remedies which nature provided What is more, he learned to improve on the preparation and modes of administration of these remedial agencies

In the development of human society, both groups of healers have played important rôles and play them to this very day Not only may we study the practices of both among primitive peoples in our own day and age, but the settling of this continent and the westward movement have demonstrated again and again the persistence of both types in more advanced, yet pioneer, society However, it appears to have been in Greece during the height of her civilization that a separation of lay medicine from temple medicine took place True, even in Egypt irregular practitioners had existed at least a thousand years earlier The "Papyrus Ebers" is said to have been the formulary of such a lay practitioner, but he was irregular, hence had no social status such as that enjoyed by the priest mediciner It was Hippocrates who, during the latter part of the fifth century and the early part of the fourth century B C raised independent medicine to its high standing True, not all lay practitioners attained a social status, for not a few, even later in Rome, were Greek slaves Yet there developed a medicine that discarded supernatural practices, and based its doings more and more on natural observations

While this is true, it is equally true that Greek medicine was influenced profoundly by the philosophical speculations of the age Thus, comparable to the general theory of the four elements there developed the specialized theory of the four cardinal juices of the human organism The remedial agents, the *materia medica*, underwent a like classification Both theories were perpetuated for more

than a millenium and are reflected in modified form in the theories of Paracelsus. The perfect mixture of the four humors was said to bring about eucrasia (eu well, and *κρασι* to mix), their imperfect mixture dyscrasia (bad). These speculations constitute the foundation of the humoral theory favored by Vesalius and recognized by medical practice for centuries.

During this high stage of medical theory and practice, the maxim was Nature heals, the physician assists in the healing process. The sad aspect of the situation lay, it has been said, in the fact that it did not continue indefinitely. With Galen, who transferred his activities from Greece to Rome during the second century of the Christian era, ancient medicine is said to have come to a close. To him has been attributed the statement that the physicians no longer knew the medicaments which they administered because they left the preparation thereof to others. This segregation of pharmacy from medicine had not come about over night as it were. Even in Greece special root gatherers (*rhizotomoi*) and cutters, preparers of medicaments (*pharmacopœi*) and of ointments (*migmatopœi*), also sellers of medicaments (*pharmacopoi*) and of ointments (*migmatopoi*) had appeared upon the scene. In Rome there had likewise developed herbarii and others. Because some of these drug sellers occupied the *Seplasion*, they were known as *seplasiarii*. Like the Greek slaves practicing lay medicine, they were of low social status. Unlike the occasional Greek slave who was freed because of the medical services which he had rendered, we do not read of a Greek *rhizotomos* or a Roman *herbarius* who was thus elevated.

As already pointed out, ancient medicine had passed its zenith with Galen. True, there were many medical writers of note who came after him, but medicine partook of the common downgrade of Roman civilization. The conquest of Rome by the Germanic barbarians toward the close of the fifth century was but an outward expression of an internal decay. The Middle Ages that followed, while spelling stagnation so far as Mediterranean civilization was concerned, meant an awakening not only of the Arabic world but also of the vast transalpine countries of Europe. Medico-pharmaceutical practice of the primitive Celts and Germans had been largely in the hands of "wise" women and priests as was the case with other primitive peoples. With the spread of Christianity, the Christian priest replaced his pagan precursor. He was the bearer, not only of scholastic learning in general, but of medico-pharmaceutical knowledge in particular. Witness the building and garden plans of St. Gall's with its medicinal herb garden separate from the culinary garden. Witness also the dispensary of the monastery Muri, now a part of the Schweizerisches Landesmuseum in Zuerich. However, the change from pagan to Christian civilization was not infrequently a surface change, not a more deep-seated change of heart. Pagan practices, medico-pharmaceutical as well as religious, centered about the descendant of the "wise" woman of an earlier civilization. Naturally, these practices were combated by the Christian priest and condemned as witchcraft. A worth-while picture of this combat has been drawn for us by Scheffel in his "Ekkehard," the monk from St. Gall's who, on the Swabian Howentwiel, threatens the "Waldfrau" with the stake. They differed possibly less in their medico-pharmaceutical practices and the herbs they employed than in their religious attitude. The Christian prayer of the one and the heathen prayer, called incantation, of the other.



If at the beginning of this period medico-pharmaceutical knowledge and skill as well as general scholastic learning were primarily a possession of the monks, the time came when a pope forbade medico-pharmaceutical practice by priests. That of the monks continued far beyond the middle ages into modern times. This change in church attitude may have been brought about by the introduction of Arabian medicine into Christian monasteries. An account of this we find, e g., in "How Constantine, the African, Brought the Art of Medicine to the Christians," viz., from Carthage in Africa to Salerno in Italy. If Greek literature was brought to Italy and thence to countries north of the Alps after the capture of Constantinople by the Turks, when Greek scholars sought refuge for themselves and their manuscripts in Italy and elsewhere, Greek medical texts had previously been spread over northern Africa and across the Mediterranean into Italy and Spain by the Moors. Not the original Greek, it is true—in this respect the medico-pharmaceutical renaissance differed from the later rebirth of classical Greek literature—but through Syrian and Persian translations and then into Arabic. Just as in ancient Greece lay medico-pharmaceutical practice had gained for itself a social position of its own as opposed to priestly standing, so during the middle ages, medicine and likewise pharmacy acquired footholds of their own quite independently of the monasteries and convents. With it came the separation of pharmacy from medicine as foreshadowed by the public apothecary shop of Bagdad in the 9th century and as it was further developed in some of the Italian cities as reflected in the edict of Roger of Sicily, and more particularly in the edicts of Frederick II, ruler of the Holy Roman Empire of the German Nation from 1215 to 1250. Not that the separation was complete. For a long time physicians and apothecaries were members of the same guilds. Moreover, the physicians for a long time constituted the ruling branch of the professions united in the same guild and lorded it over their former confrères even after the apothecaries were permitted to have their own guild.

A new era, however, was in the dawning. The discovery of a new continent widened the geographic horizon of man and thus prepared him mentally for other changes. The revival of classical learning seemed to bridge over the chasm so often referred to as the dark ages. The discovery of the use of individual type by Gutenberg made the printing press an instrument that exerted a most profound influence on the spread of ideas. The Reformation and the Counter-reformation were but ecclesiastical manifestations of the changes that were going on, not only in the religious world, but in the world at large. Medicine and pharmacy both shared in these changes from scholasticism to the renaissance in literature, art and the sciences.

The year in which the first voyagers to the West Indies returned witnessed the birth of one who was to exert a most profound influence on medicine and pharmacy as well as on chemistry. Theophrastus von Hohenheim, known to the scientific and literary world as Paracelsus, became the representative of the Nordic renaissance. The revival of classical Greek medicine *via* the Arabic school had prepared the way. Yet it was he who broke away from the Greek concepts of the crasia and humoral pathology. Nature, in and by the large, he regarded as the macrocosm, of which man, the microcosm, was a part and in whom the macrocosm was reflected.

In the place of the four so-called Aristotelean elements he accepted the three

commonly known as the Paracelsian elements, *viz*, sulphur, mercury and salt. As all chemical processes in nature are represented by sublimation, combustion and incineration, so the processes of the human body. Yet, strange as it may seem, the distinctly chemical processes of digestion Paracelsus attributed to archæus, an incomprehensible something, a sort of spirit. He is also supposed to be responsible for generation and reproduction.

Just as Greek medicine regarded the normal human body as an equilibrium of the four humors, so Paracelsus looked upon the healthy human body as a proper combination of the three elements. Again, as the Greek physician corrected the defect by administration of a drug representing the defective humor, so Paracelsus corrected any defect in the deficient element by a medicament rich in that element.

Thus it came about that changes resulted in the *materia medica*. Indeed, Paracelsus preached that it was the duty of the chemist to produce medicaments rather than to transmute baser metals into nobler ones. Not that he did not believe in transmutation. Indeed he believed, after a fashion, in the four ancient elements as well as in the modern three. Thus it came about that mineral medicaments, which had been restricted for the most part to external application, were now recommended for internal use. This was revolutionary and resulted in a century-long feud between Galenist and Paracelsist.

By the time that Paracelsus began to teach his new doctrines, the exploration of America had made the old world acquainted with a number of new drugs first described by Monardes. Moreover, the discovery of the all water route to the East Indies had greatly cheapened oriental drugs (spices and aromatics) and had made them available to ordinary medical and pharmaceutical practice. Not only that, new processes looking toward the extraction of the quintessence of these drugs were introduced. As a matter of fact, such preparations as tinctures and extracts, aromatic spirits and waters, now commonly referred to as galenicals, were introduced by Paracelsus and his followers. Extraction and distillation were regarded as distinctively chemical processes.

If the physician's medical armamentarium was greatly enriched by pharmacognostical as well as chemical additions, the apothecaries' activities were equally enlarged. Just as the physician was rapidly outgrowing his diagnostical symbol, the ural, so the apothecary outgrew, as it were, his mortar and pestle, the symbol of his art. With this change we enter upon that phase of modern pharmacy during which the apothecary shop became the cradle in which were rocked the infant sciences of chemistry and botany.

If thus we have hastily sketched some of the phases of development of the art and science of pharmacy, it does not follow by any means, that, with the ease of the spread of knowledge, made possible by the development of the art of printing with individual type, the progress of pharmacy in the several European countries was uniform. The subsequent development of the calling of the pharmacist depended as much upon political, social and economic conditions as upon the further development of the underlying sciences. Thus, whereas the status of chemistry, at the beginning of the nineteenth century, was much the same in England, France and Germany, the status of the apothecary in these countries differed greatly.

When we turn to the study of the development of pharmacy in the several countries, it seems reasonable to classify the history of pharmacy into ancient,

medieval and modern as does general history, for as already pointed out, the history of pharmacy reflects, not only the status of the underlying sciences, but the political, social and economic conditions of the respective countries as well

Even if the time available for the study of the history of pharmacy were much greater than it is apt to be, it would be unwise to attempt to outline the development of pharmacy in all countries of antiquity. It may be well to restrict ourselves to Egypt on the one hand and Greece and Rome on the other.

So far as the middle ages are concerned, an outline of the development of Arabic pharmacy should suffice. Christian medieval pharmaceutical development may be touched upon later in connection with the several countries to receive consideration.

As to the modern period, no useful purpose will be served by attempting ever so brief a review of all European countries. The countries selected should represent as many special phases of pharmaceutical development at large.

A beginning may well be made with Italy from which the renaissance spread to the transalpine countries. Florence issued the first city-state pharmacopœia in 1498. Hence the study of the bible of the apothecary may be emphasized.

In connection with France, the development of guilds, first together with physicians and spicers, later independently, and finally the change from guild to college just before the outbreak of the French Revolution should receive special attention.

Germany next affords an opportunity to study the practice of pharmacy under direct state control—the concession, both personal and real.

Finally, England is a good example of laissez-faire and all that this implies.

While these fundamental phases of pharmaceutical development are emphasized, it does not follow by any means that other aspects of pharmaceutical history should be neglected. However, the mere memorizing of dates and names should not be indulged in. Moreover, while it seems expedient to stress the development of the official pharmacopœia in connection with Italy, that of the growth of guilds with France, etc., it should not for a moment be assumed that these phases of pharmaceutical development are necessarily peculiar to the countries mentioned.

Possibly one of the best educational methods to bring in the innumerable accessories, as it were, is to make use of the lantern slide. Pictures of men, of apothecary shops, of laboratories, of drugs, of the hundred and one other phases of the practice of pharmacy may thus be brought to the attention of the student.

While the lantern slide talk may well serve the purpose of stimulating a general interest, it should not be regarded as an equivalent of home study. For this purpose the topic may be used to advantage. It will not only supply the necessary substance, but it will enable the instructor to induce the student to acquaint himself, in a measure at least, with the literature on the history of pharmacy. In order to do this, the instructor will have to collect for years the material that has become available. Mere reference to one or the other of our so-called histories of pharmacy will scarcely be satisfactory.

Having thus reviewed, though ever so briefly, the development of modern European pharmacy during the first semester, the second semester may be devoted to a somewhat more detailed study of the development of American pharmacy. New Spain, New France, New England, New Netherlands and even New Sweden

commonly known as the Paracelsian elements, *viz*, sulphur, mercury. As all chemical processes in nature are represented by sublimation, combustion, incineration, so the processes of the human body. Yet, strange as it may be, distinctly chemical processes of digestion Paracelsus attributed to an incomprehensible something, a sort of spirit. He is also supposed to be responsible for generation and reproduction.

Just as Greek medicine regarded the normal human body as an equilibrium of the four humors, so Paracelsus looked upon the healthy human body as a combination of the three elements. Again, as the Greek physician corrected a defect by administration of a drug representing the defective humor, so Paracelsus corrected any defect in the deficient element by a medicament rich in that element.

Thus it came about that changes resulted in the *materia medica*. Paracelsus preached that it was the duty of the chemist to produce medicines rather than to transmute baser metals into nobler ones. Not that he disbelieved in transmutation. Indeed he believed, after a fashion, in the four classical elements as well as in the modern three. Thus it came about that mineral medicines, which had been restricted for the most part to external application, were recommended for internal use. This was revolutionary and resulted in a certain feud between Galenist and Paracelsist.

By the time that Paracelsus began to teach his new doctrines, the exploration of America had made the old world acquainted with a number of new drugs described by Monardes. Moreover, the discovery of the all-water route to the East Indies had greatly cheapened oriental drugs (spices and aromatics) and made them available to ordinary medical and pharmaceutical practice. Only that, new processes looking toward the extraction of the quintessence of the drugs were introduced. As a matter of fact, such preparations as tinctures, extracts, aromatic spirits and waters, now commonly referred to as galenicals, were introduced by Paracelsus and his followers. Extraction and distillation were regarded as distinctively chemical processes.

If the physician's medical armamentarium was greatly enriched by pharmacognostical as well as chemical additions, the apothecaries' activities were equally enlarged. Just as the physician was rapidly outgrowing his diagnostical symbols, the urinal, so the apothecary outgrew, as it were, his mortar and pestle, the symbols of his art. With this change we enter upon that phase of modern pharmacy during which the apothecary shop became the cradle in which were rocked the infant sciences of chemistry and botany.

If thus we have hastily sketched some of the phases of development of the art and science of pharmacy, it does not follow by any means, that, with the ease of the spread of knowledge, made possible by the development of the art of printing with individual type, the progress of pharmacy in the several European countries was uniform. The subsequent development of the calling of the pharmacist depended as much upon political, social and economic conditions as upon the further development of the underlying sciences. Thus, whereas the status of chemistry, at the beginning of the nineteenth century, was much the same in England, France and Germany, the status of the apothecary in these countries differed greatly.

When we turn to the study of the development of pharmacy in the several countries, it seems reasonable to classify the history of pharmacy into ancient,

medieval and modern as does general history, for as already pointed out, the history of pharmacy reflects, not only the status of the underlying sciences, but the political, social and economic conditions of the respective countries as well

Even if the time available for the study of the history of pharmacy were much greater than it is apt to be, it would be unwise to attempt to outline the development of pharmacy in all countries of antiquity. It may be well to restrict ourselves to Egypt on the one hand and Greece and Rome on the other

So far as the middle ages are concerned, an outline of the development of Arabic pharmacy should suffice. Christian medieval pharmaceutical development may be touched upon later in connection with the several countries to receive consideration

As to the modern period, no useful purpose will be served by attempting ever so brief a review of all European countries. The countries selected should represent as many special phases of pharmaceutical development at large

A beginning may well be made with Italy from which the renaissance spread to the transalpine countries. Florence issued the first city-state pharmacopœia in 1498. Hence the study of the bible of the apothecary may be emphasized

In connection with France, the development of guilds, first together with physicians and spicers, later independently, and finally the change from guild to college just before the outbreak of the French Revolution should receive special attention

Germany next affords an opportunity to study the practice of pharmacy under direct state control—the concession, both personal and real

Finally, England is a good example of laissez-faire and all that this implies

While these fundamental phases of pharmaceutical development are emphasized, it does not follow by any means that other aspects of pharmaceutical history should be neglected. However, the mere memorizing of dates and names should not be indulged in. Moreover, while it seems expedient to stress the development of the official pharmacopœia in connection with Italy, that of the growth of guilds with France, etc., it should not for a moment be assumed that these phases of pharmaceutical development are necessarily peculiar to the countries mentioned

Possibly one of the best educational methods to bring in the innumerable accessories, as it were, is to make use of the lantern slide. Pictures of men, of apothecary shops, of laboratories, of drugs, of the hundred and one other phases of the practice of pharmacy may thus be brought to the attention of the student

While the lantern slide talk may well serve the purpose of stimulating a general interest, it should not be regarded as an equivalent of home study. For this purpose the topic may be used to advantage. It will not only supply the necessary substance, but it will enable the instructor to induce the student to acquaint himself, in a measure at least, with the literature on the history of pharmacy. In order to do this, the instructor will have to collect for years the material that has become available. Mere reference to one or the other of our so-called histories of pharmacy will scarcely be satisfactory

Having thus reviewed, though ever so briefly, the development of modern European pharmacy during the first semester, the second semester may be devoted to a somewhat more detailed study of the development of American pharmacy. New Spain, New France, New England, New Netherlands and even New Sweden

afford opportunities to study the contributions which these countries have made to American pharmacy, also what contributions to American *materia medica* their exploring representatives carried back to Europe

The Revolutionary War affords an opportunity to touch upon the army hospital apothecary, an institution imported from England, not from the European continent

With the period of reconstruction after the Revolution, there begins that westward movement of the frontier, each wave of which saw revived the frontier conditions in which the wife and mother was the family healer, the missionary not only a healer of the soul but of the body as well, in which the drug store scene described by Cooper in "The Pioneers" was reenacted again and again

While history repeated itself on the frontier, it also repeated itself, though in modified form because of modified conditions, in the more settled states along the Atlantic seaboard The organization of the College of Apothecaries in Philadelphia in 1821, changed after a year to a College of Pharmacy, reflects the changes in French organization from guild of apothecaries to college de pharmacie of a generation previous The P C P was not, as now commonly considered, an educational institution, but a closed corporation which, it is true, conducted an evening school for the apprentices of its members, as it maintained a library, a museum and, somewhat later, a journal

The influx of German apothecaries before and after forty-eight not only brought a better educated type of apothecaries to this country, but with them the idea of state control State control in turn was preceded by the organization of state associations, a movement stimulated by the AMERICAN PHARMACEUTICAL ASSOCIATION which had been organized in 1852 State legislation, which followed state organization, paved the way to our present status While the state boards kept out those completely incompetent, their low educational standards are, no doubt, responsible for the present unsatisfactory conditions as to rank and file

Having referred to present economic conditions, it may be well to indicate the turning point between the old and the new If in King Phillip's War the medicine chest of Surgeon Locke proved inadequate, the Revolutionary War demonstrated still more strikingly the inadequacy of the drug store as a provider of medicaments for large bodies of men However, it remained for the Civil War to set into motion the wheels of pharmaceutical industry, at least in the North This development against which the retail druggist fought unsuccessfully for a generation, changed the economic foundation of pharmacy and with it commercial practice Whether the socialization of all health institutes will once more revolutionize the American drug store remains to be seen

Thus one phase after another of American pharmaceutical development may be taken up with antecedent European conditions as starting point Whatever the contributions of the several European countries, American pharmacy of to-day is not merely a blend of European donations, but, in its finality, largely a product of American soil

In closing this all too sketchy outline permit me to end, as I began, with a plea Do not make a course in the history of pharmacy a cram of dates and names That is easy but scarcely satisfactory It will be more difficult to instil into the

student's mind some of the spirit of pharmaceutical history. No matter how little you accomplish in this direction, it will at least be worth while.

#### DISCUSSION

Dr Edward Kremers. Before you inspect the material that has been arranged here for demonstration purposes, I want to say just a word or two by way of specific illustration.

First of all, I should say that we have not a collection but a selection. Professor Miller, a medical colleague of mine, once became rather incensed when his collection was referred to as a collection. He said, 'it is not a collection; it is a selection.' This selection is not even a select selection. We have brought here a few things that might show those who want to teach the history of pharmacy what is available, and that even an advertisement may sometimes serve a useful purpose.

I should like to use two special illustrations, however, to make my point. Some of you may remember Elbert Hubbard who wrote a lot of biographies of poets, sculptors, men of science and what not. In writing of Dante he says: 'Just what his every day occupation was we are not sure, but as it was he clerked in a drug store and often expressed himself thus: "Lady, I am all out of liverwort to day, but I have here something just as good."'

'And he read her a few stanzas from the *Divina Nuova* that he had just written behind the screen at the prescription counter.'

Elbert Hubbard used his imagination a good deal in writing a biography. Some of our pharmaceutical biographers do the same, though.

Florence had a guild, not only one guild but at the time of Dante had twenty-one guilds representing some seventy or eighty callings. These different callings were organized into twenty-one guilds for political and military reasons and in order that a citizen might exercise his franchise he had to be a member of a guild, for it was through the representative of the guild on the common council, as we should say, that he could exercise his franchise, and in no other way.

Dante was not an apothecary. He was a member of the guild of physicians, specialists (apothecaries) and merchants, and inasmuch as the painters and the dealers in paints were a part of that guild he evidently found congenial souls therein.

I mentioned the fact that Florence was the first to have a pharmacopœia in the modern sense. Why should it be that Florence should be the first to have a pharmacopœia? Why not for instance, Venice or Genoa, the drug dealing merchant cities? Florence is right here (indicating on a map) just below the Lombardy Plains. The reason, however, is evidently very apparent if we stop to consider, for instance, that the Saint Gothard Pass, the Engadin Pass and so on, lead the roads through Florence on the way to Rome, and all roads that led to Rome had to lead through Florence. Florence, therefore, became the city of the crusaders on their way to the East, and the way of the returning crusader invalids after they had stopped at Salerno, and so on.

If you will stop to look at this valley of the Po, it is up here that in Florence, Mantua, Verona and Bergamo the first four city state pharmacopœias were developed in this industrial and agriculturally rich center of the Lombardy Plains. Rome came later. Venice and Genoa came much later. Naples came much later. The seaports were by no means the first. It was because of the active life of which the Medici were the sponsors. The Medici from 'medicus,' physician, were originally said to have been apothecaries, and the three pills in their coat of arms indicate their apothecary origin. They afterward became bankers and the pills degenerated ultimately into the three plates of the sign of our American pawn shops.

I just want to point out the importance of the background. Why should Florence have the first pharmacopœia? The pharmacopœia doesn't answer that question. You have to go back of that.

I have mentioned that the person who wants to teach the history of pharmacy will first have to be a collector. I have here a little book (I don't know whether there is another copy of it here in the U. S., there may be one in the Congressional Library, but I am not sure) which I looked for, for thirty years. One day I found a copy announced in an antiquarian catalog, and I asked our librarian to order it. Unfortunately, I fear, he procrastinated and we did not get that copy of the book. As luck would have it, within a year I saw another copy announced, only \$300. I told our librarian about it. 'Well,' I said, 'I have been looking for that book for thirty years, and \$10 a year for thirty years isn't too much for it.'

It is the first treatise on American materia medica written by Monardes, a Spanish physician of Cadiz, the port of entry of the two Indies, East and West. All of the ships that returned from the two Indies had to report there, and Monardes collected from the surgeons and sailors and any body else who collected drugs all the material he could get and thus established the first drug cabinet, and wrote the first treatise on American materia medica. That book was early translated into every language of all seafaring people: French, English, Dutch and Italian. It was also translated into Latin, the scientific language of that time. The Germans were the last. It was translated the year before our World's Columbian Exposition commemorating the four hundredth anniversary of the discovery of America.

Just a single instance of how a drug may be interesting and reflect not only medico pharmaceutical history, but economic history as well. In our historical library we have the Jesuit Relations, seventy volumes edited by the former superintendent of the Society, Reuben G. Thwaites. Fortunately, he supplied a two-volume index to those seventy volumes, so it became possible for us to glean a few pharmaceutical facts. We learn from one of the Relations by Father Jartoux, who was in Manchuria at the time, how the ginseng was collected for the Chinese emperor. He wrote about it in his story to the headquarters at Paris. Paris sent out copies to the other Jesuits; hence a copy came to Canada presumably, because Jartoux pointed out that he thought the woods of Manchuria resembled those of Canada, and that possibly the ginseng might be found over there.

It was Father Lafitau who was stationed not far from Montreal, and having read this Relation from his confrère in way-off Manchuria he went out into the woods to look for ginseng. He almost despaired finding it. Finally, he did find it, and here we have his illustration of the plant and his story of it. The book was dedicated to that *roué*, the brother of Louis XIV, the Prince of Orleans. He went with that drug to an Indian squaw and wanted to know what they called it. She said, "garentongen."

He said, "What is the meaning of 'garentongen'?"

"Man root." Ginseng in Chinese also means man root. We have here an illustration of why ginseng is a panacea. The liverwort is good for the liver because the leaf of the liverwort resembles the human liver. According to the doctrine of signatures, God has providentially not only cursed us with disease but also has provided us with remedies to cure those diseases if we but open our eyes to his creations. So the ginseng, having the shape of a man, you see represented not only an organ or an extremity but resembled the whole body, and therefore was the panacea for all troubles of mankind.

No sooner had Father Lafitau discovered the ginseng when they began to collect ginseng and the Indians were among the first to collect it. Here we have our first strike, possibly in New France. The Indians, instead of working for the settlers, refused to do the heavy agricultural work and preferred to collect ginseng and sell that to the merchants in town. So the farmers of New France greatly resented this new discovery.

You have heard of the French and Indian wars. Those French and Indian wars were conducted in part for the furs which, on the one hand, the French bought from the Indians, and on the other hand, the English settlers bought from the Indians. The ginseng also played a role with us. After fur hunting ceased in the Kickapoo Valley, ginseng hunting began, and the squatter and the settler, when he wanted some powder and shot and a bottle of whisky, would go out to hunt ginseng and take it to the store and trade it in for what he wanted more than ginseng.

More than that, after the Revolutionary War, when our thirteen original states tried to recover from the first depression, they found that they had little money if any, but they had ginseng. An economist of that period points out that it was the good fortune of the citizens of the early U. S. that they could send a ship load of ginseng to China and exchange it for silk and tea, extravagances in which some of them cared to indulge. I might add finally, that ginseng was one of the two items of trade which was valuable enough to be able to afford the wagon freight from Kentucky over the Alleghenies to the Atlantic seaboard.

Here I have given you just two illustrations, and if any of you are interested I shall be glad to visit here with you and talk over others. But I must not detain you any longer. I shall be glad to answer any questions, as I said before, either individually or collectively, as you may see fit.

If any of you want to teach the history of pharmacy (and several of you have spoken to me about it) the first thing you ought to do is to become a member of two societies, or have your libraries subscribe if you can't afford in these days of depression to become members of the two



societies One is the Société d'Histoire de la Pharmacie which publishes *Revue de l'Histoire de la Pharmacie* Here are the original bulletins published

Then the second organization which you should join is the Gesellschaft fuer Geschichte der Pharmazie which publishes its "Abhandlungen" It has been my practice to subscribe for not only one copy but two or three One copy I file away as the proceedings of the organization The other two copies I use to tear up and file the articles and illustrations with the different chapters

Finally, I have two articles, one by Herman Schelenz, the author of the "Geschichte der Pharmazie"—"The Use and Necessity of Teaching History of Pharmacy," and the other by Georg Urdang, the founder of the Gesellschaft fuer Geschichte der Pharmazie on "Wesen und Bedeutung der Geschichte der Pharmazie"

I have here a few library cards which are not up to date (they were published in 1921) which will tell you about the literature on history of pharmacy in general, and then give you a brief outline of the individual treatises and references to reviews so that you can get the opinion not only of the author and of the person who wrote the card but of the reviewers of that time as well

## SYMPOSIUM ON PRACTICING PROFESSIONAL PHARMACY \*

### THE FOUNDATIONS OF SUCCESS FOR PROFESSIONAL PHARMACY

BY E FULLERTON COOK

The promotion of professional pharmacy is very dear to the hearts of many who sit in this room, and yet as I go about I find that many pharmacists in this country are greatly disturbed because they say they have little opportunity to really practice pharmacy Some will say to me, "Our colleges are now offering four years of scientific training for professional pharmacy Why are they doing it? In my pharmacy I have little need for this training"

Fortunately, there are some who have faith and a vision, and are practicing professional pharmacy in such a magnificent way that there is encouragement, as never before in my experience, in the possibilities of professional pharmacy

We have had brought to our attention in a most spectacular fashion by two groups in the last year the importance of pharmacy in the United States The Committee on the Costs of Medical Care has brought to our attention a report which shows that there are used in the United States something between \$600,000,000 and \$700,000,000 worth of drugs and, to the astonishment of most of us in pharmacy, eighty seven per cent is sold through retail drug stores in the United States I don't believe those facts have come effectively to the attention of the practicing pharmacists of the United States In support of that, along come the remarkable figures of the Department of the Census of the United States Government just published They report approximately \$600,000,000 worth of drugs sold in the United States, of which ninety-five per cent is sold in drug stores, through department stores, one and one-tenth, through cosmetic and toilet stores, two and one tenth per cent, through general country stores one and two tenths per cent through general merchandising stores, one-tenth of one per cent, through mail order houses three tenths of a per cent Such figures indicate the importance of medicine and medical sales in retail drug stores of the United States

What I am trying to bring to your attention is the possibility of success through strictly professional activity in retail pharmacies, the departments that in the large chain stores have been a small factor May I make it perfectly clear now, and without any misunderstanding, that I am not saying there cannot be a large chain store or a large commercial pharmacy with a splendid professional pharmacy department George B Evans in Philadelphia demonstrated that it could be done The physicians of Philadelphia had great confidence in his professional departments and in the ability of his pharmacists, and the quality of his medicines was well known

Ordinarily, there are chiefly three general outlets for this very high type of professional service of pharmacy at present One is in the hospitals, where there is great opportunity for

\* See page 1021 October JOURNAL, and page 1196, November issue It is hoped to complete the papers, not printed here in another issue of the JOURNAL

professional pharmacy to be practiced with splendid cooperation from the *medical staff*. It is now being done most effectively in many places. *Secondly*, in those professional pharmacies associated with groups of physicians in medical centers, a highly professional type of service, with physicians cooperating with the pharmacy and receiving superior pharmaceutical scientific aid. In smaller communities there is also the opportunity for the pharmacist to day to have a well developed professional department, where professional dignity and skilled service are possible. This pharmacist may have on the side, in another department of that same store, the other things which the community demands, such as soaps, brushes, cosmetics, perfumes, candy, stationery, cigars and probably a soda fountain. I admit I have no sympathy with the lunch counter when it is part of the drug store. If it is a division of a department store, and the professional department is separated as a specialized professional division, it is acceptable. At least I see no objection. Unless there is the correct atmosphere and a trained and cultured pharmacist in charge, there is no opportunity for this type of professional service.

I recently heard a sermon in which the text was "Whatever ye shall ask in faith, be heaving, it shall be granted unto you." The minister said something like this: "Suppose there is a banker and he needs \$500,000. He gets down on his knees and prays the Lord to bring him \$500,000. The Lord turns to one of his angels and says, 'Look this fellow up and see whether he deserves this money.' The angel comes down to earth and investigates the man and comes back and reports, 'Yes, he is all right. He has credit, he has integrity, he has friends.' The Lord says, 'All right, let him have the \$500,000.' And because the man had lived the qualities which justified the credit, he gets the money."

That is exactly this situation here, as I see it. This fellow says, "I want to have a fine professional business." He can pray to heaven for it, and the angel comes down and looks him over. What qualities must he have? He has to be a cultured gentleman who can be at ease when he talks to his medical friends. They must have mutual relationships and mutual friendships, and meet socially. That is why we are giving four years of general and scientific college training to the pharmacists of to day. It is a tremendous asset. The technical training is essential and the ability to talk the doctor's language. The pharmacist must know much about modern therapeutic agents and about the Pharmacopœia and the National Formulary, and be prepared to supply technical information.

I know a pharmacy where physicians are calling up many times a day, and coming in. Yesterday I had the privilege of going into a relatively small professional pharmacy here in Madison. While I was there several doctors came in for information. The pharmacist said, "This is a regular part of our duty. The doctors in this building come into the pharmacy, and we give them every possible help."

I know of two skilled pharmacists conducting three special pharmacies within two squares in a large city. One physician came in and asked for help on a certain dermatologic preparation, and they conducted over one hundred experiments without cost to the physician. Not only did they win the favor of that physician, but he told his friends, resulting in many new opportunities. Their great success is evidence of the need for such professional pharmaceutical service to practicing physicians. These retail pharmacists believed in themselves and were prepared to give this type of splendid service.

A third necessity for a professional pharmacist is good equipment and a laboratory where he can be proud to meet physicians and impress the public. I advocate a prescription department open to the public. There is no better means of advertising. Let the *manufacturing* be seen by the public, also. You should be proud of your equipment and also your library. How can a technical service be rendered without a competent and adequate library?

If you believe in pharmacy, believe in yourself and work with the physician and believe in him, there is a great opportunity to-day. It is being demonstrated in many places.

The slogan for your pharmacy should be "We cooperate whole heartedly with the physicians of our community in the interest of public health."

---

Individuality and responsibility have a value in establishing the standing of the pharmacist in professional activities. Pharmacy is known by its service: the pharmacist by his personality and devotion to pharmaceutical duties.

## THE HOSPITAL FORMULARY

BY KOHRI A. HATCHER AND WINDIE J. STAINSBY \*

Large hospitals find it necessary to limit the prescriptions of the staff mainly to selected formulas, and this system has tended to promote the use of proprietary formulas which usually cost much more than their official equivalents without corresponding advantage. The physicians of the staff do not often come in contact with the purchasing department or with the pharmacy of the hospital, but they are frequently interviewed by the representatives of pharmaceutical manufacturers who persuade them that their preparations have marked advantages over the pharmacopœial.

The Formulary of the New York Hospital was prepared by a committee which invited representatives of every department to present formulas desired for their departments. In every case where a complex formula or a proprietary preparation was desired the advocate of it was requested to present evidence of its superiority over the equivalent official preparation, and unless such evidence was submitted the committee declined to admit the article, or in a few cases, admitted it with the proviso that it would be deleted unless evidence was presented that would justify its retention in a subsequent edition of the Formulary.

The Committee adopted the following rules governing the admission of articles to the Formulary:

*Rule I*—Simple official (Pharmacopœial) substances will be admitted [when requested] unless they have become superfluous.

*Rule II*—No article will be admitted (except for controlled research) before its therapeutic value has been established.

*Rule III*—No article of secret composition will be admitted.

*Rule IV*—No article which is sold under a proprietary name will be admitted under such a name if a substance of identical composition can be obtained under a non proprietary name.

*Rule V*—No mixture of two or more active substances will be admitted unless evidence is submitted that the mixture presents therapeutic advantages over the simple substances.

*Rule VI*—No proprietary article will be accepted before it has been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in 'New and Nonofficial Remedies'.

*Rule VII*—Requests for articles not included in the Formulary of the Hospital but which are desired for use in controlled research which has been approved by the head of the department in which the investigation is to be conducted will receive consideration by the Committee.

*Rule VIII*—It is the policy of the Committee to discourage the intravenous and intramuscular injection of substances which should be administered orally.

A careful examination of these rules will convince one that no article which is essential to the treatment of the sick is excluded from the Formulary. For example, insulin was admitted without question, because there is no pharmacopœial substitute. On the other hand, mere popularity was not accepted as evidence of value.

In a few cases members of the staff were so firmly convinced of the superiority of a proprietary preparation that a blind test was proposed. In one such case, each of several departments was supplied with capsules containing the official barbital, and the therapeutic equivalent of a proprietary barbital derivative. These were labeled either A or B for the smaller dosage and C or D for the larger, with the statement that the capsules contained either barbital or the derivative in question. This investigation has not yet been completed but it is intended to analyze carefully the results of the reports of the several departments of the Hospital in order to determine whether the evidence supports the contention of the advocate of the proprietary article. If the evidence does show that it is superior to barbital it will be admitted to the Formulary. It is intended to pursue a similar policy in every case so far as it is possible, so that no member of the staff can have any reason to feel that he is deprived of any drug which he considers essential but he must furnish satisfactory evidence in the form of reports of his own investigations or from the literature.

One member of the staff was so insistent on the superiority of a proprietary preparation

\* New York Hospital, Cornell University Medical College New York City

of theobromine over the official preparations that one of us has conducted a pharmacologic study of the problem involving probably about 200 experiments. While the results of these experiments are not conclusive, they do not afford any evidence that the proprietary preparation has any advantage over the official Theobromine Sodio Salicylate. However, they do tend to throw light on the value of these preparations for the relief of cardiac pain in certain conditions.

As indicated in the rules, this does not interfere with the therapeutic study of any proprietary preparation, nor does it prevent the use in any department of the Hospital of any substance, concerning the superiority of which the staff is so firmly convinced that it is willing to conduct a scientific study of its uses, or to provide it at departmental expense. Since the publications of the Formulary, the Committee has continued to pass on the acceptability of various formulas and articles requested by the staff.

The Committee could not have carried out its plans without the whole hearted cooperation of the staff, and, with very few exceptions, the rulings of the Committee have been accepted without protest after the whole subject had been discussed in considerable detail.

It is hardly necessary to state that the use of the Formulary has resulted in marked economy, but it is too early to determine the precise amount saved to the Hospital. However, we are mainly interested in a system of rational therapeutics, and we believe that the use of official preparations is far more conducive to rational therapeutics than is the use of secret or semi secret preparations, or of a great variety of preparations having nearly similar effects, and differing only in dosage.

It is hardly necessary to state that this plan requires for its fullest success a highly skilled pharmaceutical staff capable of cooperating with the medical staff of the hospital in the conduct of therapeutic research. The training of men to fill the pharmaceutical positions in such progressive hospitals constitutes at once an opportunity, and a challenge to the schools of pharmacy, for there are few such pharmacists now available.

#### PHARMACOLOGY IN THE MEDICAL CURRICULUM AND THE UNITED STATES PHARMACOPŒIA \*

By JOHN C. KRANTZ, JR

The rise of organic chemistry during the latter half of the past century, and the ever-increasing number of plant principles which were isolated, created an urgent demand for an adequate trial of these substances as therapeutic agents. To meet this emergency the science of pharmacology was created. It is a fundamental science, a combination of biological and physical science, a science that bridged the chasm between the maker and the prescriber of medicines, a science so comprehensive that to day it touches all of the ramifications of medical practice.

In America the science of pharmacology had its beginning with the appointment of John J. Abel as professor of pharmacology in the Johns Hopkins University in 1892. The far reaching influence of Abel's appointment is evidenced by the fact that many of the chairs of pharmacology in the leading universities in this country are occupied by his pupils. Since this time there has been a steady and definite trend in medical education away from *Materia Medica* as an empirical, didactic course to modern pharmacology, an experimental science. In the medical curricula to day, generally in the second year of study, there is a major course designated as pharmacology.

Generally the department of pharmacology of the medical faculty embraces, besides pharmacodynamics and pharmacotherapeutics, elementary *materia medica*, toxicology, posology, prescription writing and pharmacy. Prior to this period, in the training of the medical student, he has not come in contact with drugs or medicines and in this course the entire scope of medical pharmacology is to be introduced and the student prepared to intelligently use drugs in the clinical courses. It is at this point in the education of the physician that he becomes acquainted with the relationship between medicine and pharmacy and the significance of a national pharmacopœia in the field of therapeutics.

In the School of Medicine of the University of Maryland, we have approached the subject by dividing the material under the following subdivisions

\* Department of Pharmacology, School of Medicine, University of Maryland

- 1 The Nature and Source of Drugs
- 2 Preparing Drugs for Administration
  - (a) Pharmacy
- 3 Legal Control of Drugs
  - (a) National Standards
  - (b) Food and Drugs Act
- 4 Administering Drugs
  - (a) Prescription-Writing
- 5 The General Theories of Drug Action
- 6 The Local Action of Drugs
- 7 The Systemic or General Action of Drugs

This scheme of presentation is based upon the tracing of the drug from its source to the fate of the substance in the human organism. Topics 1 to 4, inclusive, are treated in about 20 per cent of the time devoted to the subject. Topics 5 to 7, inclusive, occupy the remaining 80 per cent of the time.

Although the status of the Pharmacopœia is emphasized in an early lecture in the course, its contents are treated in practically all of the subsequent training. The student is required to prepare 8 or 10 typical pharmaceutical preparations of the Pharmacopœia. These are prescribed by him and his own prescriptions are compounded. In this manner he is brought directly in contact with the field of incompatibility and made to appreciate the rôle of the pharmacist as a compounder of drugs.

In prescribing drugs, emphasis is placed on simplicity of prescriptions. Complicated mixtures multiply the chances of failure. Our students are urged to prescribe only those drugs, the pharmacology of which is well understood. These drugs are found between the covers of the Pharmacopœia and deviation from this authority is often born of pharmacological ignorance or general gullibility.

It has been a matter of general acceptance that oftentimes dependable therapeutic agents are developed by pharmaceutical manufacturers and owing to the patents these substances could not be recognized by the Pharmacopœia. These conditions are not very frequent. It is difficult to accumulate dependable therapeutic data. It requires often years to show the merit or uselessness of a drug. Therefore for the practitioner of medicine and for his patient as well, a progressive conservatism is indeed a safe policy. Never hastily discard the old and not without pharmacological and clinical proof try the new.

Through the ever-vigilant and indefatigable efforts of Professor Cook, the policy of the new Pharmacopœia meets this medical need. The committee is slowly but progressively reaching the stage, where recognition of a drug in the Pharmacopœia is evidence of its usefulness and merit in the diseases for which it is prescribed. This is a goal which should be diligently sought.

The innovation of an active interim revision program makes nugatory the criticism so often leveled at our Pharmacopœia, namely, that it did not keep abreast of the advance of science. In therapeutics our official standard has now acquired the unique characteristic of perpetual youth.

This formidable list of remedial agents forms the basis of modern pharmacology. Those who persistently digress, prescribing products the merits of which are extolled only by one manufacturer, should heed the dictum:

"It takes a long neck observer to see the whole firmament out of one window."

The drugs of the Pharmacopœia represent those seen through a window of national scope, by critical eyes and unprejudiced minds.

(To be continued)

---

The successful promotion of pharmacy results not only from the developed capacities of its officers but is equally dependent upon their active coöperation. Share in the activities of your state and national associations.





# THE SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

## SECTION ON EDUCATION AND LEGISLATION

**EDITOR'S NOTE** It is necessary to defer to a succeeding issue—the publication of the minutes of *joint sessions* of the Section on Education and Legislation with the Conferences of Law Enforcement Officials and of Pharmaceutical Association Secretaries—and also the minutes of the Conference of Law Enforcement Officials

ABSTRACT OF THE MINUTES OF THE SESSIONS HELD IN MADISON—CONTINUED FROM PAGE 1196,  
NOVEMBER JOURNAL

The First Session of the Section on Education and Legislation was called to order by Chairman W. Henry Rivard Wednesday, August 30th, at 2 25 P. M. He outlined the program and stated that if time permitted at the end of the session he would express some thoughts relative to education and legislation

### THE SECRETARY'S REPORT

BY CHARLES W. BALLARD

Before soliciting papers for the meetings of this Section, Chairman Rivard and the Secretary agreed that it might be desirable to concentrate on a few topics which would be of interest to those attending. These topics included a better control of the experience required for licensing, the role of pharmacy in hospitals, the National Pharmaceutical Syllabus, the liquor and beer situation in its relations to pharmacy. Letters requesting papers and opinions on these topics were sent early in May to nearly 200 members. The responses were not as numerous as in previous years but, as the same condition prevails in other sections we may conclude that it is a by-product of the general economic situation and not due to lack of interest. It so happens that all of the papers received deal with educational topics and thus pave the way for the departure from the procedure of previous years as regards the arrangement of program. Legislation affecting pharmacy has become so involved that it is probable that more satisfactory results may be had by our joining with other organizations in the legislative phase of our activities.

I wish to express my appreciation to those who have responded to our call for papers. They are doing their share toward maintaining the usefulness of our Section if not indeed in preserving its existence. I have been requested by the authors of several papers to read them in their absence and I will be glad to do so if time permits and the Chair so orders. While those in attendance rightfully have the first opportunity, the disposing of papers with the 'read by title' phrase is not adequate recognition of the time and effort spent in their preparation.

Secretary Kelly has suggested that this Section hold a joint conference on legislation passed, pending and proposed, with the Conferences of Law Enforcement Officials and the Pharmaceutical Association Secretaries. This conference to be held on August 31st at 8 00 P. M. has aroused considerable interest and offers a common meeting ground for the discussion of such topics from several angles.

'Needless to say that throughout the preparations for this meeting I have had the usual cooperation of Secretary Kelly and Editor Eberle. Their interest is best attested by the file of letters which have passed between us.'

On motion duly seconded and carried the report was received.

The following letter to Secretary Ballard was read:

I have just learned, to my great disappointment, that it will be impossible for me to attend the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. I had intended to present extemporaneously a talk about the new Syllabus and hence I do not have in the short time remaining opportunity to prepare a paper for your program. This is a very keen disappointment to me as I wanted to show your section something of the mechanics, the labor and the disappointments that go into the preparation of a Syllabus.



I trust that when my paper is called for that you will be good enough to say substantially what I have just told you and to offer for me to the members an expression of disappointment and apology

August 24

(Signed) J G BEARD

Chairman Rivard appointed the following Committee on Nominations C Leonard O'Connell Florin J Anshelm, John A J Funk

The Chairman deferred the presentation of papers in order The first paper entitled 'An Opportunity and a Challenge to Pharmacy Educators,' by Henry J Goeckel—read by Florin J Anshelm Motion carried to receive the paper (It is published in the November JOURNAL, pages 1130-1133) (Unless otherwise stated, papers read and presented were accepted)

A paper by A B Lemon 'What Constitutes Good Teaching,' owing to the absence of the author, was read in abstract by the Secretary (No discussion)

C W Ballard presented a paper on 'The New York State Pharmacy Syllabus' It was discussed by C Leonard O'Connell, Rudolph Raabe Hugo H Schaefer George W Mather W H Rivard H Evert Kendig (Discussion will accompany the paper when published)

Hugo H Schaefer read a paper by Fred B Kilmer on 'Pharmacy and Hospitals' C W Ballard commented on the paper

C Leonard O'Connell read a paper on 'The Hospital Pharmacist and His or Her Duties,' by Sister M Oswald It was discussed by H A Whitney and H Evert Kendig

Three papers listed did not reach Secretary Ballard in time for presentation

Secretary Ballard said that there had been considerable difficulty in securing papers for the Section Some discussion followed relative to subjects for papers of the next meeting—hospitals and their relation to pharmacy seemed to develop interest also the proper designation for 'pharmacy' and 'drug store' It is hoped to have these subjects for discussion in papers next year Reference was made to President Philip's discussion of these terms in his remarks

The report of the Committee on Nominations was called for It was made by C Leonard O'Connell and designated the following officers *Chairman* George C Schicks New Jersey *Vice Chairman*, Oscar E Russell Indiana *Secretary* Charles W Ballard New York *Delegate to the House of Delegates*, W Henry Rivard Rhode Island

Rudolph Raabe presided during the discussion of the report There being no further nominations it was moved that the Secretary cast a unanimous ballot for the officers named It was so ordered The officers elect expressed their appreciation and were duly installed

The Section then adjourned

## THE CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

ABSTRACT OF THE MINUTES HELD IN MADISON WIS WEDNESDAY AUGUST 30TH AND FRIDAY, SEPTEMBER 1ST

(It may become necessary to print addresses and reports apart from the minutes of the sessions)

The First Session of the Conference of Pharmaceutical Association Secretaries was convened August 30th, at 2 00 P M by President J Lester Hayman who welcomed the secretaries to the Seventh Annual Meeting

Secretary Carl G A Harring called the roll

Former President Charles Clayton presided during the reading of the President's address

### ADDRESS OF THE PRESIDENT OF THE CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

BY J LESTER HAYMAN

*Fellow Secretaries*

Some one has said that it is the aim that makes the man It is equally true I believe, that it is the aim that makes the Association It is the aim and purpose of every organization represented here to be of as much service to its individual members and to the profession which it

# THE SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

## SECTION ON EDUCATION AND LEGISLATION

**EDITOR'S NOTE** It is necessary to defer to a succeeding issue—the publication of the minutes of *joint sessions* of the Section on Education and Legislation with the Conferences of Law Enforcement Officials and of Pharmaceutical Association Secretaries—and also the minutes of the Conference of Law Enforcement Officials

ABSTRACT OF THE MINUTES OF THE SESSIONS HELD IN MADISON—CONTINUED FROM PAGE 1196,  
NOVEMBER JOURNAL

The First Session of the Section on Education and Legislation was called to order by Chairman W. Henry Rivard, Wednesday, August 30th, at 2:25 P. M. He outlined the program and stated that if time permitted at the end of the session, he would express some thoughts relative to education and legislation.

### THE SECRETARY'S REPORT

BY CHARLES W. BALLARD

Before soliciting papers for the meetings of this Section Chairman Rivard and the Secretary agreed that it might be desirable to concentrate on a few topics which would be of interest to those attending. These topics included a better control of the experience required for licensing, the role of pharmacy in hospitals, the National Pharmaceutical Syllabus, the liquor and beer situation in its relations to pharmacy. Letters requesting papers and opinions on these topics were sent early in May to nearly 200 members. The responses were not as numerous as in previous years but, as the same condition prevails in other sections, we may conclude that it is a by-product of the general economic situation and not due to lack of interest. It so happens that all of the papers received deal with educational topics and thus pave the way for the departure from the procedure of previous years as regards the arrangement of program. Legislation affecting pharmacy has become so involved that it is probable that more satisfactory results may be had by our joining with other organizations in the legislative phase of our activities.

I wish to express my appreciation to those who have responded to our call for papers. They are doing their share toward maintaining the usefulness of our Section, if not indeed in preserving its existence. I have been requested by the authors of several papers to read them in their absence and I will be glad to do so if time permits and the Chair so orders. While those in attendance rightfully have the first opportunity, the disposing of papers with the "read by title" phrase is not adequate recognition of the time and effort spent in their preparation.

Secretary Kelly has suggested that this Section hold a joint conference on legislation, pending and proposed, with the Conferences of Law Enforcement Officials and the Pharmaceutical Association Secretaries. This conference to be held on August 31st at 8:00 P. M. has aroused considerable interest and offers a common meeting ground for the discussion of such topics from several angles.

Needless to say that throughout the preparations for this meeting I have had the usual cooperation of Secretary Kelly and Editor Oberle. Their interest is best attested by the file of letters which have passed between us.

On motion duly seconded and carried the report was received.

The following letter to Secretary Ballard was read:

I have just learned, to my great disappointment, that it will be impossible for me to attend the Madison meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION. I had intended to present extemporaneously a talk about the new Syllabus, and hence I do not have in the short time remaining opportunity to prepare a paper for your program. This is a very keen disappointment to me as I wanted to show your section something of the mechanics, the labor and the disappointments that go into the preparation of a Syllabus.

I trust that when my paper is called for that you will be good enough to say substantially what I have just told you and to offer for me to the members an expression of disappointment and apology

August 24

(Signed) J G BEARD

Chairman Rivard appointed the following Committee on Nominations C Leonard O'Connell Florin J Amrhein, John A J Link

The Chairman declared the presentation of papers in order The first paper entitled 'An Opportunity and a Challenge to Pharmacy Educators,' by Henry J Goeckel—read by Florin J Amrhein Motion carried to receive the paper (It is published in the November JOURNAL, pages 1130-1133) (Unless otherwise stated papers read and presented were accepted)

A paper by A B Lemon 'What Constitutes Good Teaching' owing to the absence of the author, was read in abstract by the Secretary (No discussion)

C W Ballard presented a paper on 'The New York State Pharmacy Syllabus' It was discussed by C Leonard O'Connell Rudolph Raabe Hugo H Schaefer George W Mather W H Rivard, H Evert Kendig (Discussion will accompany the paper when published)

Hugo H Schaefer read a paper by Fred B Kulmer on 'Pharmacy and Hospitals' C W Ballard commented on the paper

C Leonard O'Connell read a paper on 'The Hospital Pharmacist and His or Her Duties' by Sister M Oswald It was discussed by H A Whitney and H Evert Kendig

Three papers listed did not reach Secretary Ballard in time for presentation

Secretary Ballard said that there had been considerable difficulty in securing papers for the Section Some discussion followed relative to subjects for papers of the next meeting—hospitals and their relation to pharmacy seemed to develop interest also the proper designation for 'pharmacy' and 'drug store' It is hoped to have these subjects for discussion in papers next year Reference was made to President Philip's discussion of these terms in his remarks

The report of the Committee on Nominations was called for It was made by C Leonard O'Connell and designated the following officers *Chairman* George C Schicks *New Jersey Vice Chairman*, Oscar E Russell *Indiana*, *Secretary* Charles W Ballard *New York Delegate to the House of Delegates* W Henry Rivard *Rhode Island*

Rudolph Raabe presided during the discussion of the report There being no further nominations it was moved that the Secretary cast a unanimous ballot for the officers named It was so ordered The officers elect expressed their appreciation and were duly installed

The Section then adjourned

## THE CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES

ABSTRACT OF THE MINUTES HELD IN MADISON, WIS., WEDNESDAY, AUGUST 30TH AND FRIDAY  
SEPTEMBER 1ST

(It may become necessary to print addresses and reports apart from the minutes of the sessions)

The First Session of the Conference of Pharmaceutical Association Secretaries was convened August 30th, at 2 00 P M., by President J Lester Hayman who welcomed the secretaries to the Seventh Annual Meeting

Secretary Carl G A Harring called the roll

Former President Charles Clayton presided during the reading of the President's address

ADDRESS OF THE PRESIDENT OF THE CONFERENCE OF PHARMACEUTICAL  
ASSOCIATION SECRETARIES

BY J LESTER HAYMAN

*Fellow Secretaries*

Some one has said that 'it is the aim that makes the man' It is equally true, I believe that it is the aim that makes the Association It is the aim and purpose of every organization represented here to be of as much service to its individual members and to the profession which it

represents as it possibly can, of that I am quite sure. Were it not for the fact that you are eager to learn the beneficial things that others of us are doing and how they are being accomplished that you may return to your office and attempt to put into practice that which is applicable to your own needs and desires, these chairs would indeed be empty.

The aim and primary purpose of this Conference is, I believe, to foster an exchange of ideas, experiences and observations, to coordinate the work of the various organizations as much as is possible by coöperating with one another and with our National organizations in problems which extend beyond our own narrow borders, to serve and help one another as much as we possibly can for the benefit of all. In the six years of our existence, which has of necessity been an experimental stage, much has been learned and much benefit has been derived by those who have been privileged to attend our conferences. However, placing for ourselves high standards, and wishing to reach them without any further effort on our part, is not sufficient.

I believe this exchange of ideas, experiences and observations can best be carried out during our meetings by the round table method and for that reason the program this year is made up of topics determined by questionnaire method as being most suitable and most beneficial. I personally have no other suggestions to offer in conducting the meetings, but should the results this year prove satisfactory, I would recommend that this procedure be carried out henceforth as a regular duty of the president.

I believe that we all realize that this Conference is very beneficial to its members. I know it is needed and is doing and can do much good. I believe its presence should be felt more keenly in the interim between meetings, and if I may, I should like to mention several things which in my opinion would be beneficial. At least I trust they will provoke discussion.

The accomplishments of this Conference, in a measure depend upon the number of secretaries in attendance at the sessions. Secretary Beard during his presidency took upon himself the obligation to write a personal letter to the president of each state association pointing out the benefits of these meetings and urging him to use his influence in seeing that his secretary was in attendance. This letter I know was responsible for the attendance that year of several secretaries who would otherwise not have been present. This year, it was my intention to do likewise, and several of the letters were sent but Fate intervened and the task was not completed. However, since presidents come and presidents go, while the secretaries remain (at least for a while), and since each state association president should be enlightened as to his duty in this matter, I would recommend that this task be imposed as a regular duty upon our president.

Attempts have been made in the past for the interchange of ideas during the year as well as during the meetings. Some members have been faithful in seeing that each secretary received a copy of their monthly or weekly bulletins. This to me has been most helpful and I should like to see it enlarged upon. In this respect I can heartily sanction Secretary Philip when he said, 'let us send that inside information, as our letters to collect dues, our S O S for member's help and letters to our political friends, copies of our blanks, forms and other bits of information that we give out at present to members only.' This indeed, is asking very little but it may be worth its weight in gold (perhaps I should say diamonds) to some other secretary. Is it not one of our aims to help one another? It has been stated that attempts have been made to carry this plan into operation in the past. It is well known that our efficient secretary has sent out questionnaires in the past. Have they failed in their purpose or have they been too few? If they have failed, wherein have they failed? Is it because we do not have the time or sufficient interest to answer them? Are our finances not sufficiently large to permit sending them? Are we not interested in what our brother secretary does or may be able to do? Or, is it because we are like many of our members in our respective organizations who when approached to do something for the good of the order meekly consent and then just as promptly forget? Should secretaries be only as human as their members? I believe it would be well done, if the secretary of this Conference could send to each member monthly or at least quarterly a mimeographed sheet asking the accomplishments of the period of the various associations and other questions deemed worth while. A periodic questionnaire, if you please. This method has been very much criticized. I realize, but until something better is offered let's use it. Even secretaries when left to themselves will not reveal the information desired unless asked, at least so it seems.

A mere glance at a calendar of pharmaceutical conventions and their dates reveal that many neighboring states hold their conventions on the same or overlapping dates. The disad-

vantages are too well known to enumerate. How to avoid it is indeed a problem. Would it be possible to divide the country into districts, the states in each district to so arrange their meeting dates so that they do not conflict? I offer no plan as to details but merely the suggestion for what it may be worth. I do believe it beneficial and much worth while for adjoining states to occasionally hold joint conventions and believe the plan should be encouraged whenever possible.

There is one thing that is always uppermost in the thoughts of secretaries such as are assembled here to day, and that is *Convention Speakers*. I know of no better service that this Conference could give, than to act as an exchange for information in regards to the procuring of good, capable convention material. The Conference in order to procure this material needs necessarily to depend upon its members for this information. I believe it should be one of the prime duties of each member to send to the secretary of this Conference, each year, immediately following his convention, information both favorable and unfavorable concerning his convention-speaking program. This service alone would, I am quite sure be worth to many of us the yearly fee paid into the treasury, and I heartily recommend that some plan along this line be worked out and put into operation.

We are at this moment entering a new era for the independent business man and for the organizations such as are here represented. Our Government has promised that in the "New Deal" the little fellow shall not be down-trodden but that he shall once again become renescent. We are given to understand that the dealings with the Government with the individual will be through the trade and professional organizations, thus making it imperative that our organizations represent as nearly 100% of our calling as possible. It is our task to bring the wayward brethren into the fold. Under this new régime our responsibilities become greater, our labors will be increased, our cooperation must be more generous. As secretaries we must be alive to any occasion, patient in our hard work, ever watchful of our opportunities, rigidly honest and hope for the best. What to morrow will bring only time will tell, may our work of to day be well done!

In closing I wish you to know that I sincerely appreciate the honor you bestowed upon me last year during my absence in electing me to act as your president, your mistake is one that I shall always cherish.

Motion was made, seconded and carried that the address be received and held over for later discussion.

Secretary-Treasurer Carl G. A. Harring rendered his report. It follows.

## SECRETARY'S ANNUAL REPORT

BY CARL G. A. HARRING

### *Brother Secretaries*

Inasmuch as time at these conferences is too valuable to be wasted on verbose reports, your secretary will endeavor to make his report short and to the point.

The minutes of last year's meeting were distributed to all secretaries as soon as received from the press and our members have had ample opportunity to familiarize themselves with many good suggestions that were brought out at that meeting. It would be interesting to know how many secretaries have presented the resolution adopted at our last conference anent closer co-operation with local associations to their respective conventions. I may say that your Secretary presented this resolution to the Massachusetts Convention where it was unanimously adopted, and as a result all local associations in our state will be asked to invite one or more of our state officers to an early meeting of their organization where emphasis will be laid on the imperative necessity of close to one hundred per cent membership in the State Association.

The original plan of our Conference, to distribute material of interest through the Secretary to all of our members may well be declared inoperative as no material has been received during the year for distribution, but this condition is offset to a large extent by the fact that nearly all secretaries now exchange publications of their association and these publications have grown in numbers to such a degree that the various secretaries are able to draw a fairly comprehensive picture of what is going on in the world of organized Pharmacy. Your Secretary nevertheless feels that it would be a great step forward if every secretary would submit a résumé of activities pertaining to

his particular office to the Conference Secretary at stated times—say once in three months—such reports if necessary to be boiled down, and distributed to the membership

The financial statement appended to this report seems to indicate that sufficient funds are on hand to enable the Conference to function at least during the ensuing year and your Treasurer strongly recommends that no dues be assessed or collected during the year of 1934

May I in conclusion add that the secretary's work has been made enjoyable through the cordial support rendered by our President, and that the many expressions of good-will received from officers and members during the past year have been highly gratifying

#### TREASURER'S REPORT, 1932

On hand January 1, 1932		\$259 03	
Received in dues		150 00	\$409 03
Disbursed			
January 17th	Mimeographing	\$2 50	
April 5th	Mimeographing	11 25	
	Stamps	3 00	
June 24th	Mimeographing	1 87	
July 16th	Mimeographing	2 95	
October 12th	Stamps	3 00	
December 30th	Donation to AMERICAN PHARMACEUTICAL ASSOCIATION	25 00	49 57
Balance on hand January 1 1933			\$359 46

So far during 1933, 23 members have paid their dues amounting to \$115 While expenditures have been around \$28, this leaves a balance on hand of around \$45

The report was received and accepted in due order

Roy C Reese, of Kansas moved that the recommendations in the Secretary Treasurer's report relative to no dues be adopted and also that a dinner be provided for at the next meeting out of the funds of the treasury The motion was carried Mr Reese also moved that the sum of \$100 be paid out of the Treasury to the AMERICAN PHARMACEUTICAL ASSOCIATION to aid in the Headquarters Building Secretary Harring moved that the sum of \$50 be paid This was seconded and carried

President Hayman said that President-Elect Swain had just come from Washington where he attended a conference on codes and members would have the opportunity to hear the latest news President Hayman also called attention to the fact that money was needed to defray the expenses of the Century of Progress Pharmaceutical Exhibit He stated that if all states would contribute something, the amount necessary would be raised

#### ROUND TABLE DISCUSSIONS

The order of business called for a round table discussion of topics The first question was, "Should the President Be the Directing Head of the Association or Should the Executive Committee be the Governing Body?"

J W Slocum of Iowa, responded that the president is the directing head but he usually acts with the approval of the executive committee In his opinion that is the proper set up namely that the president guides and submits policies for approval to the executive committee In Iowa the retiring president automatically becomes a member of the Executive Committee

Charles J Clayton of Colorado gave as a reason for the question that it was brought out in his paper last year citing that under the constitution and by laws of some states the chairman of the executive committee may be some one else and not the president If it happened that some one other than the president was chairman of the executive committee there might be a division of authority and a division of opinion He referred to a recent occurrence when a meeting was contemplated to discuss the code The invitation to attend was extended to the entire member

ship A question came up regarding the vote by all the members present—the President claimed that the vote was not valid as the meeting called for was that of the Executive Committee and no members of the committee are allowed to vote in open meeting He cited this, because it presents a division of authority when the executive committee is headed by some other person than the president In some instances the president is not a member of the board of directors, and under these conditions the president simply does what he is told Mr Clayton desired to have information from others who have had similar experience

William B Day stated that the executive committee of Illinois Association is composed of twenty five members, one from each congressional district and the president acts as chairman of the committee The officers function during called meetings and at the annual convention There is considerable expense attached to a called meeting for hotel, transportation, etc

Walter D Adams said that the Texas Association has an executive committee of six members, elected every year and the president and secretary are *ex officio* members The president votes in case of a tie but the secretary is without vote The plan has been quite satisfactory He thought that it might be improved, if the executive committee had a chairman who was really the directing head, as the chairman of the Council of the A P H A The president could make his recommendations and if acceptable, these would be adopted and put into effect He said that an executive committee, composed of a representative from each congressional district in Texas would be impracticable on account of distances An effort is made in the selection of the executive committee to have representation from all sections of the state

Robert C Wilson stated that in Georgia an executive committee and board of directors are selected from the ten congressional districts The president practically becomes a director from the district in which he resides The ten directors increased by four directors, to be appointed by the president from various parts of the state meet with the president and secretary who are *ex-officio* members with vote

Roy C Reese advised that the set up in Kansas is similar to that in Iowa There are six members of the executive committee and it is composed of the president vice president secretary, treasurer and secretary of the State Board of Pharmacy The secretary is without vote All changes of policy are referred to the executive committee This plan has been working satisfactorily

F V McCullough informed that the set up in Indiana was somewhat different There are six members of the executive committee, two of whom are elected each year at the annual meeting This executive committee meets after adjournment of the state association for organization and elects its own chairman Quarterly meetings are held The president presides and presents questions to the committee that are to be considered He takes an active part in the meeting

Robert C Wilson, of Georgia, made reference to a statement of a large manufacturing concern by which it was implied that the strength of an organization is determined by the character of the secretary

W E Bingham stated that in Alabama three members of the executive committee are elected at the annual convention The first one elected becomes chairman The president, on retiring, automatically becomes a member One member is elected for one year one for two years and one for three years The retiring president and the secretary make up the membership of the committee The executive committee was brought together in Birmingham for discussing the NRA and the chairman of the executive committee presided The executive committee has been increased to seven members

A L I Winne reported that Virginia has a committee of five members The president of the Association is chairman Three members are elected and the retiring president and the secretary-treasurer are active members with vote This plan of operation has been in effect for ten or more years and is satisfactory

J W Slocum said that in Iowa, in addition to the executive committee, an advisory board is provided for by the constitution This consists of officers of the Association members of the legislative committee, members of the Board of Pharmacy, and two members from each congressional district and all cities of 25,000 or more are entitled to representation This body acts as nominating committee of the officers at the state convention Those nominated are placed on the ballot and voted on during the convention This plan has been successful All sections of the

state are represented and there are enough representatives present from every section. A meeting is held prior to the state convention so that the names of the nominees may be placed on the ballot. If a section is not represented the president may select somebody from that district. There has been very little politics in the Association.

J W Gayle advised that the executive committee of the Kentucky Association carried out the policies of the association. The president is executive head and a member of the executive committee, the secretary is an *ex-officio* member. The committee is subject to the call of the president and the plan has been very satisfactory.

C S Pierce informed that the Maine executive committee is composed of seven members, a president, three vice-presidents, secretary-treasurer and one member appointed by the president. All of the officers have a vote and the arrangement works very well.

J J Gill said that Rhode Island has nothing new to offer. Every year an executive committee of three members is elected, the president, vice-president, secretary and treasurer are also members of the committee.

Roy C Reese stated that a meeting of the executive committee is held prior to the annual convention and on the night following the convention. Most of the questions coming to the executive committee are handled by mail.

Miss Alice-Esther Garvin said that the president appoints the executive committee. The secretary attends the meetings and takes the minutes. Five meetings are held annually and the members pay their own expenses. She preferred a committee of which the retiring president would become a member —(Connecticut).

O W McShane stated that in Vermont the executive committee is composed of the president, secretary, three vice presidents and three members, all elected at the annual meeting.

Carl G A Harring said that in Massachusetts the president is *ex-officio* president of the executive committee. In his opinion, the executive board should be composed of two vice presidents, the secretary and treasurer, and two former presidents.

O W McShane referred to a past presidents' group in the Vermont Association—the members act in an advisory capacity.

J Lester Hayman said that in West Virginia the executive committee is composed of the president, three vice-presidents, secretary and treasurer, and three members elected for three years. The transactions of the committee are conducted by mail or telephone.

*Topic No 7* was presented, 'Contests and Novel Schemes for Increasing Interest in Annual Meetings.'

Roy C Reese referred to a prescription contest in Kansas—Members of the Senior class of the University School of Pharmacy were permitted to enter this contest, which created considerable interest. One of the faculty of the School of Pharmacy was on the program to speak, but the time allotted was too brief, and next year provision will be made for a longer address. A feature of the meeting was the drawing of prizes for merchandise contributed by several stores and members. In his opinion the program should be cut down as to speakers and a round table discussion should be instituted.

J Lester Hayman stated that about the same system was followed in West Virginia, but a registering booklet was used, with a ticket for each session and the fee taken up at the door. In order for a person to be eligible for selection for a prize he must be present at the session.

Charles J Clayton stated that in Colorado they followed somewhat similar lines. However, he referred to a plan in South Dakota which he thought very good. This was presented in an interview between Editor George Bender and Mr Keller who operates several drug stores in Minneapolis. Mr Bender asked questions and Mr Keller gave the answers. These questions related to details of store management.

W E Bingham was interested in learning how non members could come into the convention, when prizes were given out.

J M Plaxco said that in South Carolina only dues paid members are admitted. They must present a card to that effect and register.

J Lester Hayman stated that certain prizes are given only to retail druggists, travelers and others are given distinctive badges.

A L I Winne said that they had a similar plan in Virginia. The drawing card this year was a discussion of the NRA.



Charles J. Clayton referred to a play which was carried out in Colorado during the address of a speaker which created quite a little interest and surprises

Robert C. Wilson said that the member who attends the annual meeting must have something to take back home with him. This creates an interest for his coming back to the next convention

J. Lester Hayman spoke of a plan whereby prizes are given for analyzing prescriptions and presenting them

Ralph W. Clark said that in Wisconsin different colored ribbons were used in designating those in attendance. The prize features of the Association are carried on by the traveling men. He also referred to a number of members who do not pay their dues although their business would indicate that they are perfectly able to do so. Team captains are now appointed for collecting past dues

Roy C. Reese said they were doing about the same thing in Kansas. Team captains are appointed in various counties who look after delinquents. These team captains have been more successful than he had been as secretary in collecting dues

Prof. Anton Hogstad said he had listened with interest to the scheme but, in his opinion, the greatest interest is aroused by setting up a regular pharmacy and discussing various phases. Along with that, other departments of the store may be profitably discussed. This is in line with a plan which had been made effective at various points where he had lectured

F. V. McCullough stated that, as part of the program in Indiana, druggists from country towns discuss methods of selling insecticides, those of professional pharmacies, the prescription phase and others deal with soda fountains, etc.—This develops a program of wide variation. Traveling men pay dues and a subscription fee to the *Indiana Pharmacist*, which becomes part of the entertainment fund

H. J. Nic was of the opinion that the programs should be arranged so they will be both profitable and interesting. He was supported by Professor Hogstad who was of the opinion that discussions should relate more to pharmacy than is generally the case

J. W. Slocum stated that in his opinion programs of state associations should include all divisions of the drug trade

Reference was made to drinking at conventions. The consensus of opinion seemed to be that this situation is improving

Ralph W. Clark stated that in Wisconsin they had a field man who is under contract to produce \$4000 worth of advertising and to get 500 new members. His membership quota has been filled up to October

J. W. Slocum suggested that the secretaries cooperate in supplying the names of those available for speakers at conventions. Following this a motion was made and carried that the Secretary of the Conference send a circular letter to each of the secretaries to ascertain the names of those available as speakers

J. Lester Hayman was tempted to try the idea of the Minneapolis convention to have local druggists speak

Walter D. Adams said this was tried out in Texas very successfully

## SECOND SESSION

The Second Session of the Conference of Pharmaceutical Association Secretaries was convened September 1st at 2:00 P. M., by President J. Lester Hayman. A motion was made, seconded and carried that the Secretary be instructed to write the various secretaries of the state associations to report quarterly on their activities

President Philip expressed his appreciation of the work of the Conference

F. V. McCullough inquired of President Philip whether he had any suggestions to make regarding the payment of dues of local and state associations and connecting up the entire group on the order of the American Medical Association

President Philip replied that he explained the plan in the House of Delegates. In his opinion there are too many cross purposes. The members are becoming more interested in a combination scheme. The affiliation of the different organizations will not be brought about within a year, possibly not for a number of years, but eventually this arrangement will come about and when this results there will be closer cooperation of all bodies, and in his opinion, it would be

said when the plan has been successfully brought about—that it should have been in effect sooner

Robert C Wilson stated that in his opinion such affiliation should be encouraged and the matter of combination dues should be carefully thought out

President Philip contended that we should not hold our associations too cheaply The dues must be sufficient to carry on work or the plan will not be effective He stated that in California \$21 per year had been collected and this can be done if good service is given Membership in the Chamber of Commerce costs from \$20 to \$25 in the Rotary Club, \$60 to \$75 What is needed is courage, and he cited a number of experiences which proved his contention

J Lester Hayman stated that the need of cooperation and unity was shown at Washington

Roy C Reese suggested that \$50 be sent to the Century of Progress Exposition in Chicago and instead of \$50 to the AMERICAN PHARMACEUTICAL ASSOCIATION Building at Washington the organization should try and make that \$100 also that the matter of not collecting dues be reconsidered The suggestions made were adopted in the following order that the Secretary be instructed to send a contribution of \$50 to the Century of Progress Committee at Chicago and that a contribution of \$100, in two instalments, be sent to the A P H A for the Headquarters Building in Washington It was also voted to collect dues for the ensuing year and that a dinner be provided for, but the question of taking the money out of the Treasury be left open until that time

Roy C Reese moved that Secretary Haring be instructed to draw a check of \$50 payable to himself as an honorarium This was seconded and carried

J W Slocum moved that the Secretary be instructed to send a letter of sympathy and condolence to Secretary Gustave Bachman of the Minnesota Pharmaceutical Association who had sustained injuries in an accident Carried

President J Lester Hayman presented subjects 8a and 8b for discussion—8a In what states are local district meetings habitually held and what is the character of the programs at such meetings? 8b, Are you following some concerted plan to link up these meetings with your state associations for the purpose of increasing your membership?

J W Slocum stated that in Iowa, District Meetings are held, the membership question does not enter—the membership is an automatic renewal of registration—the dues are collected on renewal Iowa has nine Congressional Districts and a meeting is held in each of the districts Five meetings were held in one week in different congressional districts and four during the following week in the remaining districts He said that this is not fully adequate to cover the entire state but the meeting places are located so that it is not difficult for each member to attend at least one The Secretary usually selects the location of these meetings and the Executive Committee approves them The purpose of these meetings is to contact a little more closely the individual members many of whom cannot attend the state convention

The members also feel a little more free to express their opinions at these district meetings and are more interested It has been felt that a speaker who can interest and enthuse is quite essential This year Dusty Miller of Ohio has been selected He is not a druggist but he is a good speaker The convention is called right after lunch and those who desire to participate in amusements have the opportunity for doing so A dinner is served at 6 30, attended by ladies a business session follows Entertainments are provided for the ladies

Mr Slocum said that the more successful meetings are not held in the larger cities The success of a program depends largely on the interest created These meetings have been held for fifteen years and the one of last year was probably the most successful After the speaking program discussions are held on timely subjects The expenses of the meeting are not over \$300 and some of them have cost as little as \$200

W E Bingham asked relative to membership and membership dues

Mr Slocum explained that no dues are collected at district meetings

Secretary Kelly said he was glad to have come into the room while Mr Slocum was talking He explained that Maryland is divided into two sections Baltimore is one section and the other part of the state comprises the other An effort is made to bring the work of the Association to the members Many of the members are unable to attend the state convention and are always interested in hearing of the happenings, so this enters in the program of the district meetings Two of these meetings are held annually in each section and these meetings are attended by the president and other officers If it is a legislative year the members are interested in discussion of legis

lative matters and reports of the legislative committee. Speakers are provided for the professional, economic and commercial phases and are usually quite successful. As a result of these district meetings the members show a great deal more interest in the annual meetings. Pharmacists also invite physicians to attend—this creates a spirit of cooperation. After dinner, which is held at night, there are informal discussions on various problems.

Robert C. Wilson spoke of the work of the Georgia Association. He said that during the last two years effort has been made to hold meetings in each congressional district. In these districts a president and a secretary are elected and they arrange the dates of the meetings and the place and the program. An effort is made to enlist members for the state association in the district meetings. The president of the District Association automatically becomes a member of the Board of Directors of the state association. This is helpful in legislative problems for the president gets in touch with district members and in that way splendid results are obtained. At the present time the Georgia association has a larger membership than ever before and each district is reporting new members. In his opinion, within the next year 85% to 95% of the drug stores will be represented.

Walter D. Adams said that there were seven district associations in Texas and they meet twice a year. It is attempted to have at least one member of the official family (State Association) present.

Texas is a very large state and there is some trouble in getting around. Until recently the dues of the State Association were collected by the State Pharmacy Board. They had collected and were about to turn over to the State Association \$9000 when the point was raised that this part of the law was unconstitutional. An expert counsel was employed and it is hoped to get a new ruling.

J. M. Placeo said that in South Carolina there were nine Congressional Districts and these were organized on an initial fee of \$1 per member. So far, no additional fee has been requested.

J. W. Slocum spoke of the cigarette legislation in Iowa. The City Council has the power to grant licenses and to withhold licenses at any time. The Supreme Court has upheld this legislation.

Carl G. A. Harring stated that local associations were good but only so long as they are held together and attached to the state and national associations. He said that when he returned home he would send out letters to the members, impressing the necessity of local association members being also members of the state association.

J. Lester Hayman stated that fifteen senatorial districts had been organized in West Virginia and in each district a president and secretary are elected and these are members of the state executive committee.

Roy C. Reese stated that in Kansas they had provided for a committee of two members who are retail druggists, two salesmen and the secretary of the state association—that leaves the balance of power with the secretary and he sees that the salesmen get a square deal. This has made the convention more interesting for the members and also has resulted in building up a fund of about \$800. The two salesmen of the committee appoint a sub-committee and its members handle the entertainment features.

E. F. Kelly said that the Maryland Association had a traveling men's auxiliary which is provided for in the constitution and by laws. This committee takes entire charge of the entertainment and submits all proposals to the executive committee. The experience has been very satisfactory. The salesmen help out in membership drives and also in collecting dues. They also carry important news to the various sections of the state.

Charles J. Clayton reported that in 1926 the Colorado Association had not registered more than 150, but a drive was started by the association of the salesmen—their efforts and newspaper publicity increased the number, in 1931, to 557. This year, however, the enrollment dropped to 467 registered pharmacists. The entertainment is sponsored by the drug interests who choose their own chairman and, as a result, the entertainment features have been improved. At one time it was necessary to raise money by advertising but the traveling men are now taking care of that, so that for the last convention they raised \$1900 and this was divided by the association and the traveling men's organization. They also handled the advance program.

President Philip said he was sorry that it was impossible for him to attend the meeting continuously. He numbered some of his best friends among the traveling men and was of the opin-

ion that they should receive cooperation and that the salesmen should have separate meetings from those of the state associations. However, publicity should be given by the state association to the traveling men's auxiliary. The entertainments could be held jointly and the traveling men should pay the usual registration fee.

F V McCullough advised that in Indiana the traveling men are auxiliary members. They pay \$3—\$1 of which is subscription to the *Indiana Pharmacist* the other \$2 going into the treasury of the Association. The traveling men meet with the officers in January and April for instructions as to the state meeting. The merchandise donated as prizes is shipped to the convention city and distributed by a joint committee, one appointed by the president of the Association and one by the president of the Salesmen's Auxiliary.

Henry J Nie inquired relative to local druggists bearing the cost of the convention.

President Philip replied that sometimes local people are expected to bear too much of the expense. He thought that the members would feel better if a smaller part of the convention expenses was defrayed by the local committee.

Charles J Clayton stated that the Colorado Association did not expect the local committee to defray the expenses except those of the reception on the first night.

J Lester Hayman said that in West Virginia the salesmen's auxiliary arranges for the entertainment but druggists make contributions to them in money.

It was agreed to take up *Question 3*, "The Resolutions of the Convention—who writes them? Should the Secretary take an active part in preparing them?"

F V McCullough said he had attended conventions in a number of states and that he is occasionally a member of the committee on resolutions. A difficulty that sometimes obtains is that no one is familiar with drafting resolutions and the members of the committee do not anticipate what wording will be needed and consequently some of them are not prepared. He always carried a number of resolutions with him to the convention on anticipated subjects and, if these matters are brought up the resolutions can be promptly presented.

President W Bruce Philip considered the idea a good one and it might be well for members who are interested to carry with them thirty or forty standard resolutions. Resolutions should be handled and so worded that they can receive prompt consideration.

Walter D Adams said that as Secretary, he carried a file of resolution material and copies are handed to some member of the Committee on Resolutions, so that the resolutions are drafted when they go before the convention.

Miss Alice-Esther Garvin wondered what became of the resolutions.

J Lester Hayman stated that resolutions in West Virginia were taken up before the end of the president's term.

Walter D Adams said that in Texas the executive committee studies the resolutions.

Carl G A Harring reported that in Massachusetts these are taken care of by the Secretary and directed to the proper channels.

C Leonard O'Connell said that in Pennsylvania resolutions are presented at the second to the last meeting. A resolutions' committee is appointed, of which the members of the Executive Council are *ex officio* members. The resolutions are prepared in proper form and discussed before the meeting.

*Question 4* "Is it desirable to divide states into zones for the purpose of giving each zone representation in the presidency by rotation?"

J W Slocum advocated this plan in Iowa and he thought that the state should be divided into quarters. In this way as the retiring president becomes a member of the executive committee each section would have representation.

Charles J Clayton stated that this would not work very well in Colorado. It is deemed necessary that the president be located near Denver in legislative years. Colorado is a state of distances and it is inconvenient and expensive for a member to come a long distance to attend legislative sessions.

William B Day said the rule in Illinois is that a president may come from Chicago only once in three years, so that other sections of the state receive consideration.

*Question 6* "Is it possible to devise some plan whereby neighboring states may avoid holding conventions at the same time?"

It was moved, seconded and carried that the incoming president appoint a committee to make a study of this question and report at the next convention

Charles J Clayton said that if this was properly handled it would make it possible to arrange for speakers at conventions in adjoining states Colorado depends somewhat on tourists' trade and this business opens up about July first If the state convention is held about the 15th the hotels are crowded, there is little privacy and the charges for meals and rooms are higher, so that the meetings are arranged for the advantage of the members He favored the plan suggested by the question and that information on the subject be sent to the secretaries of the Conference

It was moved and seconded and carried that Mr Wilson send to the Secretary such information as is available regarding the findings of the Georgia State Committee on the subject of taxation and that the Secretary forward such information to the various secretaries of the Conference A motion was made seconded and carried that a resolution be drawn up and sent to the Massachusetts Board of Pharmacy commending the efficiency of Secretary Harring and asking that the Board arrange for his return to the Conference to be held next year

Chairman Walter D Adams reported for the Committee on Nominations as follows *President*, R C Wilson, Georgia, *Vice President*, F V McCullough, Indiana, *Second Vice-President*, E R Weaver Oklahoma, *Secretary Treasurer*, Carl G A Harring, Massachusetts, *Delegates to the House of Delegates*, William B Day Illinois *Executive Committee*, J Lester Hayman, West Virginia, James J Gill Rhode Island W E Bingham, Alabama, Roy C Reese, Kansas

On motion duly seconded and carried, the report of the Nominating Committee was adopted and the nominees elected

Walter D Adams introduced the new president, R C Wilson, who thanked the Conference for the honor bestowed

The Annual Session of the Conference, on motion duly seconded and a vote was then adjourned

## THE GROWTH OF PROFESSIONAL PHARMACY \*

BY C B JORDAN

'Every time we have a business session at Purdue University to which President Philip has referred, the president of the University welcomes those who attend He begins his welcome by describing the drug store he is used to seeing, and asking if that is pharmacy

"I want to say to you that medicine has been worshipping strange gods Those of you who sat in the meetings of the Association of American Colleges of Pharmacy and heard Dr Zapffe's talk, know what I mean I was fortunate in having Dr Zapffe, who is executive secretary of the Association of American Medical Colleges, come to us to give us an address, and the chief theme of his impressive address was that the colleges of medicine were not giving sufficient attention to teaching *materia medica* and pharmacology, and that as a result they were discarding the beneficial *materia medica* as represented by the Recipe Book, the National Formulary, the United States Pharmacopœia

'Pharmacy has also been worshipping strange gods, and I am glad to see it coming back to the consideration of professional pharmacy as indicated by this symposium

'I am delighted to know that the AMERICAN PHARMACEUTICAL ASSOCIATION is giving this time to the discussion of professional pharmacy From the fact that I have talked before this ASSOCIATION yearly for the last four years on professional pharmacy, I think it is clear to you that I am enthusiastic about it

'Recently, I spoke to a group in this city on Professional Pharmacy, and at the end of my address one of the young men came up to me and said, 'I think you are too enthusiastic about the opportunities of professional pharmacy'

"I said Perhaps I am I hope I will not lead any young man astray and have him enter professional pharmacy and fail, but if I can get the pharmacists of the United States to appreciate the opportunities that are present in professional pharmacy, I think I can be excused for over-enthusiasm'"

\* From an address of the Symposium on "Practicing Professional Pharmacy," Madison Wis—See page 1021, October JOURNAL

# PROCEEDINGS OF THE LOCAL BRANCHES

## BALTIMORE

The Pharmacy School of the University of Maryland was host to the Baltimore Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION at its November meeting held on Thursday, November sixteenth. The meeting was held jointly with the Baltimore Retail Druggists Association and the Alumni Association of the School of Pharmacy University of Maryland.

Dr. Louis P. Hamberger, a Baltimore physician, presented an extremely interesting motion picture entitled "How Harvey Discovered the Circulation of the Blood." Doctor Hamberger pointed out that until Harvey's time (1628) the idea of a circulatory system was unknown. The picture was based upon Harvey's original 72 page treatise wherein he described his experiments. The photographs are of work undertaken by Sir Thomas Lewis and H. H. Dale of England.

At the conclusion of the picture Prof. Marvin R. Thompson of the School of Pharmacy gave a lecture on the physiological standardization of digitalis which was followed by a demonstration in his laboratory. Professor Thompson outlined the most recent knowledge concerning the stability and standardization of this cardiac stimulant. The laboratory demonstration included the U. S. P. X. one hour frog method, the cat method of assay and perfusion experiments as well as charts previously prepared.

The meeting was held, particularly, as a friendly get together for pharmacists and physicians. A number of interesting displays of U. S. P. and N. F. preparations had been prepared by the School of Pharmacy and were available for the visiting physicians to inspect. Approximately ninety persons attended the meeting including practicing physicians, retail pharmacists, chemists, medical students and pharmacy students.

The officers of the Branch wish to extend their thanks to Doctor Hamberger and Professor Thompson. Appreciation is extended particularly to the School of Pharmacy for the delightful refreshments served at the conclusion of the meeting.

C. JELLEFF CARR, *Secretary-Treasurer*  
1296

## CHICAGO

The 216th meeting of the Chicago Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on November 21st at the University of Illinois College of Medicine.

A large gathering of about 200 listeners assembled to greet Herr Max Borger, who very interestingly told of his experiences as a drug apprentice with the Merck Company of Darmstadt, Germany.

From Mr. Borger's report it can easily be seen that the apprentice in the German drug store gets more actual experience in the handling and use of drugs than the average American apprentice.

The drug stores in Germany are divided into two distinct classes, one of the classes not being allowed to fill prescriptions. Established drug stores can be purchased or inherited, but new stores cannot be opened except by permission of the government; this automatically does away with overcrowding, a condition that we are confronted with in the United States.

The German druggist makes up more of his tinctures than the average American druggist; they also keep in stock and dispense on prescriptions more crude drugs, urine and sputum tests are also made by them.

The prices of prescriptions are controlled by the government, the price to be charged for each ingredient and the labor is automatically set, the government annually inspects the drugs that are being dispensed.

While the prescription drug store is open fewer hours than the American drug store, a pharmacist must be at the store for emergency purposes twenty-four hours of the day; sleeping quarters are provided in the store for the night man.

The meeting was prolonged for some time with many interesting questions being asked by the audience and answered by Dr. Borger.

LAWRENCE TEMPLETON *Secretary*

## DETROIT

The November meeting of the Detroit Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at Webster Hall,

Thursday evening, November 16th The meeting was preceded by a dinner

In the absence of President Johnson the meeting was called to order by Berton Todd of the College of the City of Detroit The minutes of the previous meeting were read by the secretary and approved

Chairman R T Lakey of the Program Committee, announced that the December meeting would be given over to a Christmas Party, following the custom of many years

Fred Ingram introduced the speaker of the evening, Dr J J Sherman, professor of Political Science Liberal Arts College, College of the City of Detroit who spoke on "Government by Code"

The speaker said that government is a machinery in which the state exercises its will The first government was by Royal decree later, it was turned over to legislators who grew and grew and since the 90's government has been by boards and bureaus In 1933 the people realized that something was wrong and they welcomed the "New Deal" and advice of the brain trust which has given us government by code

The cause of the present condition, he stated was the result of the factory worker receiving as low as 17 cents a day in 1932 and 14 cents a day for the farmer who cut hay with a tractor, haled it with a gasoline engine, hauled it in a motor truck only to find that motors could not eat the hay

The success of the NRA, Mr Sherman told the assembly, depended entirely upon the cooperation of the people, he urged patience with the Government and the various codes until they may have time to adjust the difficulties which they have presented These conditions have not sprung up over night and therefore, will take a correspondingly long time to correct

The listeners were startled when told that the standards of living began to fall when the Government presented 160 acres of land to anyone who would live on it five years Then the automobile industry sprang up and bolstered up conditions, and it was expected that radio would do likewise, but the radio to day only produces 8 cents an hour to labor Therefore it is necessary that we get together and do one of two things Support the President's program and the codes adopted for the various industries or go back to the 160 acres of land

The presiding officer thanked the speaker

for his most interesting and timely talk A considerable discussion followed, led by C A Weaver and Fred Ingram, who seemed to agree with Mr Sherman that, if tolerance and patience are exercised, the codes will be the means of bringing industry out of the present dilemma

A rising vote of thanks was given the speaker

BERNARD A BIALK Secretary

## NEW YORK

The November meeting of the New York Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held on November 13th in the College of Pharmacy of Columbia University President Billhuber presided and there were about sixty five members and guests present The report of the secretary was read and approved

Chairman Lehman, of the Legislative and Education Committee reported on the Physicians and Pharmacists Dinner held on October 24th He explained that the work was being carried further by the committee in charge of the recent dinner

Chairman Kassner, of the Membership Committee, called attention to the slip on the bottom of the meeting notice urging members to send in the names of persons interested in joining the AMERICAN PHARMACEUTICAL ASSOCIATION

The secretary read a communication from Dean George C Schicks of the New Jersey College of Pharmacy, announcing the organization meeting of the Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION on November 20th Dr H H Schaefer moved that a letter of congratulations and good wishes be sent to the New Jersey Branch This was seconded and approved

Following the reading of a letter from Chairman J Leon Lascoff, of the Physicians and Pharmacists Dinner Committee asking for a contribution of ten dollars Dr Ballard moved that this be paid The motion was approved

The first speaker of the evening was Harry Miller, who spoke on "The Drug Institute and the Retail Drug Code" A summary of Mr Miller's address follows

Many stories of the origin of the Drug Institute have been told but Mr Miller believed that Jerry McQuade started the thought when at a meeting which he called about a year ago last June he voiced the hope that the

drug industry could be organized around a body similar to the Steel Institute. It was felt that no single branch of the industry could do this alone but that the cooperation of all divisions was essential. The industry needed price stabilization. The Drug Institute was patterned after the Steel Institute and it was formed before the NRA existed. The NRA coming as it did at a time before the Drug Institute could make a start with its original plans, made it necessary for the Institute to reduce its activities and permit the Government to go ahead with its own ideas. Surely the Institute had to wait until the Administration had clearly formulated its plans. It became necessary for each industry to present a code for adoption by the President. In this work for the Drug Industry the Institute coöperated in every way but it did not write nor present a code. Its efforts were directed toward cooperation with other national drug organizations. Mr. Miller stated emphatically that the President did not sign the code which would have stopped rugged individuals in our industry. This code fixed, in a general way, the resale price and the Administration would not approve this provision. Pointing out that many drug retailers were unable to operate at a profit, and that many chain stores were also in the "red," Mr. Miller deplored the rejection of the price maintenance provision. He went on to say that price cutting is contrary to the President's objectives in his drive to raise wages and increase employment. Curtailment of the price cutting evil is essential. In the code as finally adopted, a ray of hope remains in that an interpretation must be placed on the section of the code which reads "But the selling price of articles to the consumer should include an allowance for actual wages of store labor, to be fixed and published from time to time by the Trade Authority hereinafter established." In the explanatory comments the following additional information is provided, "No retailer shall sell merchandise below the amount such merchandise costs him from the wholesaler or manufacturer (except as noted below). This provision becomes effective upon the effective date of the code, regardless of whether the Retail Trade Authority or the Retail Drug Trade Authority shall have fixed an allowance for labor cost." Both cost of merchandise and labor cost must be defined by the administering officer. The speaker then went on to discuss some of the

provisions of the code and he expressed the opinion that its administration would be very difficult, if not impossible.

Realizing that the Code as finally adopted did not go far enough and that the NRA holds no hope of providing the retail druggist with what he needs most—price stabilization—the Drug Institute was going ahead with its original aims and purposes. The Drug Institute needs cleaning up and the Drug Institute is the organization to do the job contemplated Mr. Miller.

Finally, the speaker pointed out that the codes of other industries contained price maintenance clauses and thus demonstrated that unity of the drug industry was necessary to win the same rights.

Dr. Fischelis was next called upon to present his views regarding the Drug Institute and the Retail Code. He began by pointing out that the primary ends in view by President Roosevelt, in the administration of the NRA, were to put people to work, to regulate hours and wages, and to increase purchase power generally. Now the industries thought that they could take advantage of the situation and thus in one swoop wipe out all the evils and unfair practices which plagued business. But the Administration saw through this and did not permit it.

The Drug Institute made an error when it did not stick by its original purpose. He pointed out that many of the canvassers for membership in the Drug Institute made false claims regarding what the Institute could and would accomplish. The recovery program was used as a feature to enlist members.

The speaker next emphasized that the Institute did take an active part in the hearings of the code and that this proved unfortunate because the code was to be a retailer's code and the Institute represented all branches of the industry. The original code was not a retail code in its major features. Participation of the Drug Institute in the hearings provided opponents of the code with ammunition since the Drug Institute was not exclusively a retail organization.

In the hearings pharmacy leaders made two mistakes.

*First.* Knowing that labor was favored by the Administration they failed to consult leaders of labor in the drug industry. Hence, drug clerks and others were given an opportunity to present a case which strongly impressed the Administration. Furthermore a



plea was made to exempt the pharmacist from limitation of hours of work because he was a professional man. This was a mistake. Dr Fischelis said that much time and effort were devoted to undoing the harm caused by this oversight.

*Second* The retailers did not leave the impression that this was purely a retail code and that it did not involve manufacturers, wholesalers, and their problems.

The President had 130,000,000 people to think of and not 60,000 retail druggists alone. Hence, the price maintenance provisions fell in disfavor. Predatory price cutting was with us in good times and now more than ever it has become necessary for the industry itself to clean house. Cooperation is lacking in the industry, and Dr Fischelis concluded by hoping that the Drug Institute or some similar body would be able to gather the necessary facts to present an intelligent argument for additions and revisions of the code.

Dr Anderson, the next speaker began by stating that both previous speakers were somewhat incorrect in their explanation of why the original code was not signed by the President. Failure resulted because five per cent of the dishonest hypocrites in the industry were able to so impress the authorities, including the President, that they reversed their opinions on the price maintenance clause. He contended that these five per cent predatory cutters, the chiselers, were able to overpower the ninety five per cent honest, sincere retailers. It has now become necessary to convince the authorities and the public that price cutting is unsound, that price cutting throughout all industries would ruin the nation. Because of certain provisions in the adopted code, Pharmacy is worse off than before, Dr Anderson believes. Therefore he approves of the Drug Institute and believes that further progress and hope rests in the success of that organization. The Institute has a great opportunity to eliminate the evils in our industry, and concluded by asking whether or not the Institute will prove equal to the situation.

Dr J. L. Lascoff commented on failure of the code to include a price maintenance clause. He believed that some good could be expected through favorable interpretation of some of the provisions. He added that not a few of the troubles in the industry could be cleared up by cooperation from the manufacturers, and cited an example.

N. S. Gesoalde in his comments on the Drug Institute and the code said that the Drug Institute was what the industry needed for years. The 30,000 retail members of the Institute looked to that body for help and it could not fail them. The speaker believed that the code, as adopted, was a great boon to the industry in spite of its shortcomings. He also believed that many benefits would be gained later when favorable interpretations are placed on some of the clauses of the code. In conclusion he said that 50% of the cut-throat competitors could now be eliminated through rigid application of the present regulations.

Finally, E. A. Means was called upon, he began by calling attention to the fact that the code is a complex and serious affair. He said that the Government is in the position to do the talking and that we, of the industry, have little to say at present. He added that the three branches of the industry must cooperate to bring order out of chaos. He believed that the Drug Institute had not been oversold and that much would be gained through its efforts. Furthermore Mr. Means emphasized that the troubles of the druggist in New York were not always the troubles of the druggist in other sections of the country. He pointed out that price cutting was not a serious menace in certain sections of the country, for through cooperative efforts druggists had established fair prices. The speaker agreed that in every branch of the industry there were certain unscrupulous members and that some retailers had exploited labor. This proved to be a great handicap in hearings held in Washington.

In conclusion Mr. Means said that a standard of business practices would be useless until we were united in a sincere effort to put such a plan into actual practice.

Mr. Miller was granted an opportunity to answer criticism directed at the Drug Institute. Following his remarks the meeting adjourned after a vote of thanks was accorded all speakers.

RUDOLF O. HAUKE, *Secretary*

#### NORTHERN NEW JERSEY

The Northern New Jersey Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION, held its third meeting at the Elks Club, in Newark, on the evening of November 20th. The occasion was a very pleasant dinner which served to formally introduce the new body to Pharmacy in New Jersey. Music and flowers

created an atmosphere which, together with good food, perfectly set the stage for the speakers who were to follow

About eighty members of the Branch and their friends were present. Greetings and good wishes from other pharmaceutical bodies and colleges were brought by their representatives a list of whom follows

President Walter R. Woolley, New Jersey Pharmaceutical Association, Secretary Prescott R. Loveland, New Jersey Pharmaceutical Association, Secretary Robert P. Fischelis, New Jersey State Board of Pharmacy, President Frank H. Eby, Philadelphia Branch, A. P. H. A., President Ernest A. Bilhuber, New York Branch, A. P. H. A., Treasurer Charles W. Holton, AMERICAN PHARMACEUTICAL ASSOCIATION, Dean Henry V. Army, Columbia University College of Pharmacy, Eugene G. Eberle, editor, JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

Governor Moore felicitated the Branch by letter. Dr. Fischelis read the communication and added that the Governor was genuinely pleased to hear of the birth of the new organization that he felt there was real need for such a professional body. Mayor Ellenbogen of Newark also sent a most appropriate greeting, which was read by Toastmaster R. W. Rodman. Dean J. W. Sturmer of Philadelphia College of Pharmacy congratulating the Branch by letter stated that it would be a beneficial factor in professional pharmacy.

The 'piece de resistance' of the evening was a group of three addresses. These were delivered by Secretary Evander F. Kelly, President Robert L. Swain and President Ernest Little, of the Northern New Jersey Branch. Their listeners were moved with mingled feelings of pride in Pharmacy, its organizations and a new sense of duty toward both.

Editor Eberle gave the Branch a stereopticon treat when he displayed a series of slides depicting the history of the new American Institute of Pharmacy Headquarters Building at Washington, D. C. After that the gathering resolved itself into little informal groups where old acquaintances were renewed and the problems of the day settled satisfactorily.

The banquet gave the Branch a most auspicious start. It is certain that the organization will carry on from there in the true tradition of professional pharmacy. Its program of action is such that its influence will

grow and much good will come because of its work.

L. W. RISING *Secretary*

## PHILADELPHIA

The November meeting of the Philadelphia Branch of the AMERICAN PHARMACEUTICAL ASSOCIATION was held at the School of Pharmacy, Temple University, Tuesday evening, November 14, 1933. The meeting was called to order by President Frank H. Eby who introduced the speaker of the evening, President Robert L. Swain of the AMERICAN PHARMACEUTICAL ASSOCIATION who spoke on 'The Retail Drug Code—Its Interpretation and Possible Effects'.

The speaker played a very important part in drafting the Retail Drug Code as submitted to the NRA and he thus has a very definite understanding of the code which was signed by President Roosevelt in October 1933. He stated that the present code was a great disappointment to retail pharmacists, and not what they expected.

In analyzing the code the speaker devoted most of his time to a discussion of those parts which most vitally interest the pharmacist. He also read and discussed various interpretations which have been issued by the NRA. A number of these interpretations are very important in the successful enforcement of the code. He explained that other interpretations would be issued at intervals as considered necessary by the NRA.

Dr. Swain explained that the Retail Drug Code as it applies to pharmacy will be administered by a National Retail Drug Council. Dr. E. F. Kelly has been appointed the representative on this council for the AMERICAN PHARMACEUTICAL ASSOCIATION. It was explained that Retail Trade Councils would be organized in certain communities for the purpose of adjusting certain complaints that may arise during the administration of the code regulations. Retail Trade Councils will be limited in their powers.

The speaker stated that he believed the code was a step in the right direction and even though the code did not give to Pharmacy some things which were desired, he felt that distinct benefit would be derived by pharmacists. It is certain that some changes will be made in the code by the NRA as conditions warrant. These changes may possibly bring some of the results hoped for by pharmacists. He urged all pharmacists to give their whole

hearted cooperation in President Roosevelt's program for recovery.

Following Dr. Swain's address, Dr. Robert P. Fischel gave a very interesting discussion on certain phases of the code. He also expressed his views regarding certain interpretations which have been issued by the NRA covering the Retail Drug Code.

At the close of the meeting, a large and enthusiastic gathering extended a rising vote of thanks to Dr. Swain for his most excellent address, as well as his untiring efforts in behalf of retail pharmacists.

F. H. MacLAUGHLIN, *Secretary*

### PITTSBURGH

The Pittsburgh branch of the AMERICAN PHARMACEUTICAL ASSOCIATION met Tuesday Evening, October 17, 1933, at the Pittsburgh College of Pharmacy. Thirty-three members were present.

The minutes of the May 16, 1933 meeting were read and approved. Communications from the Central Office were brought to the attention of the group.

President Clarence F. Van Meter presented the speaker of the evening, Mr. Robert R. Gaw. Mr. Gaw is president of the Pennsylvania Pharmaceutical Association and president of the McKennan Pharmacy, Pittsburgh. Mr. Gaw's subject was 'The New Era in Professional Pharmacy.' His theme was built around this thought, taken from LaWall's

Four Thousand Years of Pharmacy: 'The primary function of pharmacy is to prepare medicines for those who require them. It is therefore a highly specialized calling which may rise to the dignity of a true profession or sink to the level of the lowest commercialism according to the ideals, the ability and the training of the one who practices it.'

The speaker cited many instances from his personal experience. He indicated how necessary it is for the pharmacist to keep informed on present pharmaceutical and medical problems, to be familiar with the new and recent remedial agents so that when he is called upon for such information he is able to give it intelligently. He told of the importance of calling upon physicians and acquainting them with the newer preparations and the specialized service which the pharmacist is able to render and stressed very forcefully the importance of the close relationship necessary among pharmacists and seemed to be of the firm opinion that a very necessary duty of every pharmacist

is real support of his professional organizations.

Mr. Gaw very ably related incidents that have occurred during his unusual experience in conducting one of Pittsburgh's first professional pharmacies. In concluding his program, he conducted an open forum. Many questions were asked and much information was freely given about the methods in conducting a pharmacy which does not sell 'patent medicines' but is for its policy the 'service of purveying prescriptions and remedial agents to physicians and their patients.'

FRANK S. MCGINNIS, *Reporter*

### CINCINNATI

Secretary R. I. Pils of the Cincinnati Branch, A. Ph. A. advised of interesting sessions. The recent meeting, in the absence of President Herman Schuler, was presided over by John P. Jenne. The speakers of the evening were Frank H. Fredericks and B. Kottel. Features of the evening were reports of the meetings of the AMERICAN PHARMACEUTICAL ASSOCIATION and National Association of Retail Druggists.

### LECTURES AT COLUMBIA UNIVERSITY COLLEGE OF PHARMACY

The Lecture Bureau of the College of Pharmacy, Columbia University, announces a series of lectures to be given by various members of the teaching staff on successive Saturdays. These lectures are to be given to students in high schools who are members of biological, chemical, medical, scientific clubs, etc.

Dr. J. F. Suchy, professor in the School of Pharmacy, has completed his work in drug and food chemistry this past summer for his doctor's degree. Dr. Suchy's thesis was 'A Study of the Preparation, Properties, Toxicity and Pharmacological Action of Various Strychnine Benzoates.'

Dr. A. B. J. Moore, member of the A. Ph. A. formerly of McGill University, saved the life of a Sydney Australia, merchant who had been seriously injured. Professor Moore was home ward bound when a wireless giving account of the accident was picked up by a Canadian vessel. Dr. Moore was taken a distance of 95 miles to the injured man on Lord Howe Island, Australian coast and through this attention the life of Mr. Parke was saved.

# ASSOCIATION BUSINESS

AD INTERIM BUSINESS OF THE COUNCIL OF THE AMERICAN PHARMACEUTICAL  
ASSOCIATION, 1933-1934

Office of the Secretary, 10 W Chase Street Baltimore Md

## LETTER NO 4

November 27, 1933

To the Members of the Council

20 *Minutes of the Council* Motion No 1 (see Letter No 2, page 1058) has been carried and the minutes are approved

21 *Use of Text of N F V* Motion No 2 (see Letter No 2, page 1058) has been carried and the J B Lippincott Co has been advised

22 *Election of Members* Motion No 3 (see Letter No 2, page 1058) has been carried and applicants numbered 1 to 9, inclusive are declared elected

23 *Transfer of Property between the U S A and the Association as Provided under Public Resolution No 18 and the Agreement for the Occupancy of U S Reservation No 332-B* Motion No 4 (see Letter No 3 page 1065) has been carried unanimously Dr R P Fischelis wrote as follows

I was impressed with the comment of Dr Dunning's attorney on the permit granted the ASSOCIATION for use of reservation 332-B as an approach to the property

"I shall be glad to vote in the affirmative on Motion No 4, if it is understood that every effort was made to avoid the inclusion of the clause in the permit to the effect that it is revokable at will by the Director of National Park Buildings and Reservations In other words, if this is the kind of an agreement that has to be made by all other organizations in similar positions, we cannot expect anything different If on the other hand some organizations have been able to avoid the inclusion of this clause I feel that a further effort should be made to have it excluded

Kindly let the record indicate that my affirmative vote in favor of No 4 is modified by the attitude expressed in this letter"

Dr Fischelis was advised that the clause to which he refers is included in the agreement for the occupancy of U S Reservation No 332-A by the National Academy of Sciences as quoted on page 1064 of Letter No 3 The president and secretary have signed the agreement for the Occupancy of U S Reservation No 332-B, and the deeds for the transfer of property will be signed and recorded as promptly as possible

24 *Sale and Exchange of Liberty Bonds* Certain series of the Fourth Liberty Loan Bonds, 1933-1938 have been called for payment at par on April 15, 1934 or they may be exchanged as of that date at par for Treasury Bonds, 1945, bearing interest at 4 1/4% from April 15 to October 15 1934, and thereafter at 3 1/4% to maturity, the bonds being callable at par on or after 1942

The following amounts of the called bonds are in the funds named

Endowment Fund	\$ 2 000 00
Life Membership Fund	11 000 00
Research Fund	6 000 00
Headquarters Building Fund	100 00
Wm Procter Jr, Monument Fund	100 00

After careful investigation and after receiving advice from various sources the Committee on Finance believes it to be advisable to exchange the called bonds for uncalled bonds of the same issue The exchange can now be made on an even basis and at no charge The uncalled bonds cannot be called until or after October 15 1934 and probably conditions will be more settled by that time The exchange will maintain the present distribution and interest rate in these funds

It will be necessary as explained to the members of the Council in Madison to transfer

five thousand dollars of the accumulated interest in the Life Membership Fund, invested in the above bonds, to the Current Fund

(Motion No 5) *It is moved by Swain, as Chairman of the Committee on Finance, that the called Fourth Liberty Loan Bonds listed above be sold or exchanged on an even basis for uncalled bonds of the same issue and that since most of the called bonds are registered, and as this form is required, the following be adopted*

Resolved, that C W Holton, treasurer, and E F Kelly, secretary, are hereby authorized to buy, sell, deal in, assign or negotiate the called Fourth Liberty Loan Bonds which are owned by, or registered in the name of the AMERICAN PHARMACEUTICAL ASSOCIATION and to that end to endorse, transfer and deliver the same

25 *National Retail Drug Trade Council* On October 21th, the secretary was advised by NRA officials that the Code of Fair Competition for the Retail Drug Trade had been signed and would become effective on October 30th The ASSOCIATION was requested to select its temporary representative on the National Retail Drug Trade Council as provided for in the Code, the permanent representative to be selected later after the proper method had been determined It was also requested that the temporary representative attend a meeting of the Council in Washington on October 27th

After consultation, President Swain and Chairman Holton recommended that the secretary serve as the temporary representative This recommendation was submitted to the members of the Council either personally, by telephone or by telegram and it was approved

The Administration has approved as temporary representatives John A Goode and John W Dargavel for the N A R D, E F Kelly for the A P H A, and Wheeler Sammons for the Drug Institute of America, Inc Later George M Gales was approved as the representative of the National Association of Chain Drug Stores

The Council was organized with John A Goode as chairman and E F Kelly as secretary-treasurer, and has established its office in the Tower Building, 11th and K Sts, N W, Washington, D C

When a method of selection has been determined upon, the ASSOCIATION will be requested to select its permanent representative on the Council

26 *Applicants for Membership* The following applications properly endorsed and accompanied by the first year's dues have been received

No 10, Wm C Alexander, P O Box 608, Salida, Colo, No 11, James A Armanasco, 531 S 26th St, Richmond, Cal, No 12, Philip Basson, 133 Cambridge Ave, Jersey City, N J, No 13, Annabel Beatty, 480 Avon Ave, Newark, N J, No 14, Henry Bellis, 642 10th Ave, San Francisco, Cal, No 15, Frank O Berg, Owl Drug Store, Astoria, Oreg, No 16, Albert Bloom, 3166 Kensington Ave, Philadelphia, Pa, No 17, Edgar J Bragger, c/o Hoffmann La Roche, Inc, Nutley, N J, No 18, Maurice E Bryant, 605 Campus Ave, Pullman, Wash, No 19, Andrew Brown, 1502 Pittston Ave, Scranton, Pa, No 20, Bert N Dalton, 238 Vestal Ave, Binghamton, N Y, No 21, W J Dunsmoor, 600 Campus Ave, Pullman, Wash, No 22, Joseph Ebert, 135 S 11th St, Philadelphia, Pa, No 23, C H Evans, 218 Main St, Warrenton, Ga, No 24, Robert P Games, 546 Broadway, Bayonne N J, No 25, Henry S Godshall, 134 Congress Ave, Lansdowne, Pa, No 26, Mary C Grace, 3336 Bouck Ave, Bronx, N Y C, N Y, No 27, Vince M Harrington, Mariana, Ark, No 28, L R Henderson, 100 E 2nd St, Muscatine, Iowa, No 29, Harry Isacoff, 29 Woodford St, Worcester, Mass, No 30, L V Johnson, St Michaels, Md, No 31, Milton Kahn, 212 W Main St, Somerville, N J, No 32, J C Kearfoot, 2 Main St, Martinsville, Va, No 33, W H Keen, P O Box 558, Perry Point, Md, No 34, Joe Knight, Lebanon, Mo, No 35, Prescott R Loveland, 214 Chelsea Natl Bank Bldg, Atlantic City, N J, No 36, T Joseph McAuliffe, 184 Lewis St, Lynn Mass, No 37, George Mathews, 1257 S Capital St, Washington, D C, No 38, Abram Mosler, 210 Park Place, Orange, N J, No 39, Charles Mueller, 368 Plane St, Newark, N J, No 40, Fumiko Murayama, 1624 Post St, San Francisco Cal, No 41, Kermit Myklebust, 203 Spaulding St, Pullman, Wash, No 42, John E O'Brien, 2002 Farnam St, Omaha, Neb, No 43, Murray W Posner, 1209 Lexington Ave, New York, N Y, No 44, John X Powers, 420 E Davenport St, Iowa City, Iowa, No 45, Floyd K Riggs, 219 Broad St, Newark, N J, No 46, E F Rimmer, 131 East Park Ave, Charlotte, N Car, No 47, Max M Rosenberg, 875 Brooklyn Ave, Brooklyn, N Y, No 48, W L Sampson, 538 Summer Ave, Newark, N J, No 49, Joseph Schick, 2072

Grove St , San Francisco Cal , No 50, George A Stanley, 1301 W Lafayette, Detroit Mich , No 51 Henry A Stype, 201 East Liberty St , Wooster, Ohio, No 52 John Torigian, 93-20—240th St Queens Village, L I N Y , No 53 Arthur Van Hooser, Metropolis, Ill , No 54 Clarence J Williams, 1220—30th Ave , San Francisco, Cal , No 55 Harry Wolff, 1366 Blue Hill Ave Mattapan, Mass No 56 Robert Haws Wuensch 30 S Kingman Road South Orange N J

(Motion No 6) *Vote on applications for membership in the American Pharmaceutical Association*

E F KELLY *Secretary*

## MARKETING PRESCRIPTION DEPARTMENT ITEMS

BY FRANK A DELGADO

Manufacturers, dealers importers and wholesalers of chemicals, botanical drugs, fixed and volatile oils, pharmaceuticals biologicals and ethical trade named specialties are or should be interested in the extent to which these items are being prescribed by physicians Among other questions which drug manufacturers and wholesalers have been asking and the answers to which are now available, it is believed for the first time are

- 1 What percentage of the nation's prescription business is handled by professional pharmacies?
- 2 To what extent if any, have specialty type prescriptions grown over the last 20 years?
- 3 Have prescriptions in liquid form increased?
- 4 Are prescriptions calling for capsules and tablets decreasing or increasing?
- 5 What is the average prescription department dollar inventory investment?
- 6 How is this investment divided between chemicals botanical drugs, fixed oils essential oils biologicals galenicals and specialties?
- 7 What does it cost to purchase the basic equipment necessary to stock a prescription department and is a list of the necessary equipment available?
- 8 What books should the average drug store have in its library, and what would they cost?
- 9 What type of container is advisable for prescription calling for capsules, pills and tablets?
- 10 What percentage of total drug store volume consisted of liquor prescriptions?
- 11 Does prescription volume take a drop in summer months?
- 12 Are prescription prices lower in professional pharmacies than in the usual commercial type drug store?
- 13 Have pharmacists increased their prescription prices during the past twenty years?
- 14 What is the actual cost to the pharmacist of the ingredients in various types of prescriptions?
- 15 Has the tendency of physicians during the past twenty years been to prescribe specialties more than U S P and N F preparations?
- 16 To what extent do pharmacists detail physicians?
- 17 Are the physicians who have graduated in recent years inclined to prescribe a different type of ingredients from those who began to practice before the War?
- 18 How many new drug stores open every year?
- 19 What is the maximum number of different ingredients required to fill 10 000 prescriptions?
- 20 How would these be divided between chemicals galenicals and specialties?
- 21 How many would be called for as many as 10 times each per 10,000 prescriptions?
- 22 How many prescription department items distributed judiciously among chemicals galenicals and manufacturers' specialties should prove to be an adequate opening order and what would be their cost?
- 23 How many different ingredients are required to fill the first 500 prescriptions and how many for each succeeding block of 500?
- 24 How many prescriptions per day does the average drug store fill the first year in business?

- 25 Does prescription volume become greater as drug stores grow older?
- 26 What percentage of prescriptions filled are private formula prescriptions?
- 27 What type of practitioner tends to write the bulk of private formula prescriptions?
- 28 What percentage of the total number of items stocked in a prescription department have no movements in the course of a year?
- 29 Of those items without movement how many were chemicals, galenicals, specialties, etc?
- 30 How many new manufacturers' specialties have been introduced in the past few years and what is the extent of their use in prescriptions?
- 31 To what extent do physicians specify a particular brand when prescribing galenicals?
- 32 What are the leading chemicals, galenicals, specialties, etc. from the point of view of their demand in prescriptions?

Space will not permit in an article of this length the enumeration of more than a few of the facts brought to light in the professional phase of the National Drug Store Survey. Therefore, in this article only those facts which are believed to be of special interest to manufacturers will be mentioned. Answers to all of the above questions and many more which may come to mind, will be found in 'The Professional Pharmacy', the second report on the prescription department phases of the National Drug Store Survey.

We are taking the liberty of quoting from a review in the following:

The value of the information contained in this report is not believed to be confined to the proprietors of professional pharmacies. It contains much information which should be of practical value to the proprietors of commercial type drug stores in increasing their volume of prescription business and the profit possibilities of their prescription departments. Professors and students in colleges of pharmacy may find herein answers to some of the questions about which there has been conjecture. Drug wholesalers and manufacturers of chemicals, galenicals and pharmaceutical specialties should find the list of leading ingredients, which was compiled after an analysis of 20,000 prescriptions, of particular interest. Pharmacists who are contemplating the operation of a professional pharmacy will find certain information particularly directed to them. It is hoped, therefore, that all branches of the drug profession and trade will be in some way aided by the information presented in this report.

Reprints of "Professional Pharmacy" will be bound in paper cover at 25 cents per copy, 10 per cent discount in quantities of 6 or more and 20 per cent discount in quantities of 100 or more, 1000 or more 25 per cent discount.

It is assumed that every drug store in the United States, as well as in other countries, will want one or more copies, wholesalers and manufacturers will want a larger number. It is assumed the schools of pharmacy will desire the publication for their students. Requests should be made promptly, as it is contemplated to give the order for the reprints as soon as a sufficient number are ordered. If sufficient orders are received to warrant such binding reprints in buckram will be supplied at \$1 per copy.

#### COMMERCE DEPARTMENT CONTINUES SERVICES

Services to the drug trade will be continued in 1934, according to C. C. Concannon, Chief of the Chemical Division, Bureau of Foreign and Domestic Commerce, Washington, D. C. These services include a weekly *bulletin* which gives news of the world affecting the drug trade of the United States. The export publications cover shipments of medicinal oils, biologics, pharmaceuticals, proprietary medicines, toilet preparations, crude drugs, etc. Import publications detail receipts of crude drugs, miscellaneous chemicals and perfumery. All these statements show quantity and value as well as countries of origin and destination.

The statement of imports for consumption covers the entire field of drugs, chemicals, dyes, plastics, etc. The weekly *World Trade Notes*, issued each Monday, contains an average of 40 news items gathered from all parts of the world, together with a list of foreign trade opportunities received during the preceding week.

Mr. Concannon will be pleased to forward free sample copies of any of the Division's publications.

Benjamin E. Holsendorf has been appointed and commissioned as Passed Assistant-Pharmacist with the grade of Passed Assistant Surgeon in the Regular Corps of the U. S. Public Health Service.

## EDITORIAL NOTES

*Because of Association Reports which required many pages publication of a number of papers and items in this Section had to be deferred*

### A CORRECTION

Mrs Rebecca R Reese, a grand niece of Dr Richard H Stabler a former president of the AMERICAN PHARMACEUTICAL ASSOCIATION, has called attention to two errors in the Historian's Report, on page 1192 of the November JOURNAL, 5th paragraph Richard H Stabler, referred to, was *not* a partner in the Stabler pharmacy but was owner of the store on the corner of King and Washington Sts, still maintained as a drug store by J E W Timberman, Alexandria The William Stabler referred to was Dr Richard Stabler's half brother, the former was a son of Edward Stabler by his first wife, Mary Pleasants Richard H was the son of Edward Stabler and his second wife Mary Hartshorne Stabler

Mrs Reese is chairman of the Executive Committee of the Association for the Preservation of Alexandria Antiquities a purpose of the organization is to raise funds for purchasing the building in which the pharmacy of Edward Stabler afterward Leadbeater pharmacy was established and preserve the old apothecary shop as a museum

### UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission announces the following named open competitive examinations for

#### TOXICOLOGIST POSITIONS

Applications for toxicologist positions of various grades must be on file with the U S Civil Service Commission at Washington, D C, not later than January 11, 1934 At present there is a vacancy in the position of assistant toxicologist in the Bureau of Chemistry and Soils, Department of Agriculture with headquarters in San Francisco Calif The entrance salary for assistant toxicologist ranges from \$2600 to \$3200 a year Entrance salaries for all grades covered by the examination range from \$2600 to \$5400 a year, less a deduction of not to exceed 15 per cent as a measure of economy and a retirement deduction of  $3\frac{1}{2}$  per cent

Competitors will not be required to report for a written examination, but will be rated on

their education and experience Certain specified education and experience are required

Full information may be obtained from the Secretary of the United States Civil Service Board of Examiners at the post office or custom house in any city, or from the United States Civil Service Commission, Washington, D C

### COMMENT IN NATIONAL RECOVERY ADMINISTRATION, RETAIL BULLETIN NO 1

The terms "registered pharmacist" as "sistant pharmacist" and "apprentice pharmacist," as used herein (Code) shall have the meaning given to them under the laws of the respective states of the United States and of Alaska

A worker to be classified in this group must comply with the state law requirements for his position The separate classification of pharmacists and professional persons is not intended to reflect in any way upon the recognized standing of pharmacists

### THE CENTENARY OF THE DIS- COVERY OF DIASTASE

The present year represents the centenary of the discovery of diastase, an incident of great importance for the biologic sciences and not without considerable significance for medicine In 1830 Dubrunfaut prepared an extract of malt that converted starch into sugar just as since early in the nineteenth century strong acids were known to do His paper was really the first account of the action of an enzyme in solution Three years later in 1833, Payen and Persoz precipitated by alcohol from such extracts a substance that could be dried and preserved and that had a powerful action on starch Thus they called "diastase" The term has continued in use in France almost to the present time as synonymous for the substances more commonly designated to day as enzymes Of course the production of sugar in the process of malting was known before 1833, but the modern scientific history of enzymes and their action really commences with the researches of Payen and Persoz on diastase

To day at a time when enzymes seem to be recognized to a greater extent than ever be-



fore as possible potent agents in the biologic process of disease as well as of health, it may seem worth while to recall a few of the steps that have led to the current interest in those unusual specific biochemical catalysts that are termed enzymes. In the early period as the number of recognized diastase like products grew they were designated in general as "ferments" on account of similarities in their activities to those of alcoholic fermentation. Presently substances of the diastase type were distinguished as "soluble" or "unorganized" ferments in contradistinction to living organisms, like yeast, to which the name "organized ferments" was then applied. The inevitable confusion led the Heidelberg physiologist, Kuhne in 1878 to suggest a new name. The publication in which this first occurred is so rare and so few students have actually read it, that we venture to repeat the interesting passage, in translation:

The latter designation (*i. e.* formed and unformed ferments) has not gained general acceptance, in that on the one hand it was objected that chemical bodies such as ptyalin and pepsin could not be called ferments since the name was already given to yeast cells and other organisms (Brücke), while on the other hand it was said that yeast cells could not be called ferments, because then all organisms including man, would have to be so designated (Hoppe Seyler). Without stopping to inquire further why the name excited so much opposition, I have taken the opportunity to suggest a new one, and I give the name enzymes to some of the better known substances, called by many 'unformed ferments'. This is not intended to imply any particular hypothesis, but it merely states that (in yeast) something occurs that exerts this or that activity, which is considered to belong to the class called fermentative. The name is not, however, intended to be limited to the invertin of yeast, but it is intended to imply that more complex organisms from which the enzymes, pepsin, trypsin, etc., can be obtained are not so fundamentally different from the unicellular organisms as some people would have us believe"—*Journal A. M. A.*, November 11 1933

#### THE NATIONAL DRUG TRADE CONFERENCE

In an editorial of this issue of the JOURNAL the part of the AMERICAN PHARMACEUTICAL

ASSOCIATION in food and drug legislation is discussed.

The National Drug Trade Conference met in annual session in Washington, December 5th at which time a special committee was appointed on the revision of the Food and Drugs Act consisting of J. H. Beal, chairman, R. I. Swain, W. Bruce Philip, H. W. Bigelow, H. B. Thompson, J. G. Beard, W. L. Crounse, R. E. L. Williamson, Harry Noonan, representing the constituent associations of the Conference.

Chairman J. H. Beal later presented an analysis of the Copeland Bill (S 1944) A draft of suggested amendments—to amend the Food and Drugs Act June 30 1906, as amended August 23 1912 March 3, 1913 July 24, 1919, January 18, 1927, and July 8 1930—was offered in connection with the statements of Chairman Beal before the Sub Committee of the Senate Committee on Commerce, December 7 1933. (At this hearing Walter G. Campbell, Chief of the Food and Drug Administration explained the Copeland Bill. The hearing is being printed and copies may be had by addressing your Congressman or Senator.)

Complete reports of the sessions of the Drug Trade Conference—containing the statements of Chairman Beal suggested amendments, with discussions at the hearing—have been given to the press by the National Drug Trade Conference. It should be stated that the discussions and actions on this important matter, participated in by the members, representing the phases of pharmacy and the drug trade, were outstanding subjects of the meeting. The effect of the foregoing at the hearing is expressed by statements of Senator Copeland that the bill will be revised in many particulars. As stated, the bill under discussion was S 1944 introduced by the latter and popularly known as the "Tugwell Bill." The progress of this important legislation will be reported in succeeding issues of the JOURNAL.

James H. Beal reported that revisions are in preparation of the table of potent and toxic drugs. Reprints of the table are available, having been reprinted by the AMERICAN PHARMACEUTICAL ASSOCIATION.

President R. I. Swain reported for the committee on the general status of pharmacy and the drug trade. He recognized that the present offered an outstanding opportunity for co-operation and advised readjustment in keeping with NRA purposes. He also reported on the study of prescription tolerances.

Progress was reported in simplification of glass containers enactment of state narcotic laws, greater efforts in securing endowments for pharmaceutical research was urged

The conference reaffirmed its approval of the principle of the bills designed to legalize price maintenance contracts The position of the Conference with respect to improvement in the status of pharmacists in the army was also reaffirmed H C Christensen presented a detailed report of the pharmacal exhibit at the Chicago 'Century of Progress' exposition The Conference thanked Mr Christensen and gave approval to his suggestion that an effort be made to have a similar exhibit at the repeated fair next year The value of the exhibit in respect to public relations was attested by several members'

The following officers were elected for the ensuing year

*President*, Carson P Fraley, Washington  
American Drug Manufacturers Association

*Vice President* A C Taylor Washington

National Association of Boards of Pharmacy  
*Secretary-Treasurer*, E F Kelly Washington  
AMERICAN PHARMACEUTICAL ASSOCIATION  
*Councilor in the Chamber of Commerce of the United States* S L Hilton, Washington  
*Members of the Executive Committee* W B Philip, National Association of Retail Druggists, W L Crounse, National Wholesale Druggists' Association, Harry Noonan American Pharmaceutical Manufacturers Association, J G Beard, American Association of Colleges of Pharmacy P I Heusler Proprietary Association, R E Lee Williamson, Federal Wholesale Druggists' Association

E L Newcomb says—'there never was a time when there was a greater need for pharmacists to emphasize their professional service If they do not do this effectively, they are sure to be engulfed in the commercial maelstrom which has completely disrupted every normal activity in this country Pharmacy has got to fight for its preservation'

## OBITUARY

### JOSEPH W ENGLAND

Joseph Winters England, member of the AMERICAN PHARMACEUTICAL ASSOCIATION since



JOSEPH W ENGLAND

a son of Robert and Louisa R. England His paternal forebears were of Swedish descent settling at Swedesboro, N J, in 1682 his mother's ancestors were Huguenots from Alsace France, who settled among the Pennsylvania Germans in Lancaster County, in 1728 His father was a well and favorably known pharmacist of Philadelphia

Joseph W England was educated in the Philadelphia public schools and learned the retail drug business in his father's pharmacy He graduated from the Philadelphia College of Pharmacy in 1883, winning the Henry C Lea prize for the most meritorious thesis (on *Myrtus Cheken*) of his class He studied medicine at the University of Pennsylvania and in 1886, was elected Chief Druggist of the Philadelphia Hospital (Department of Charities and Correction)

In 1900, he became head of the pharmaceutical department of H K Mulford Company, in 1902 he resigned to accept the position as consulting pharmacist to Smith, Kline and French Company, and served as director of its Research Laboratory until his demise

He was widely known for his researches which covered a broad field in pharmacy and contributed many original articles to pharmaceutical organizations and publications, he was editor of the historical volume of 728 pages

1893 died in Atlantic City, December 2nd, aged 72 years He was born in Philadelphia

"First Century of the Philadelphia College of Pharmacy." From 1891 to 1901, he was editor of the *Union Report*, and served as member of the publication committee of the *American Journal of Pharmacy* from 1893 until his death.

Mr England, soon after graduation took an active and continued interest in the affairs of his *Alma Mater*. He served as curator of the Museum from 1887 to 1920, was member of the board of trustees from 1892, and chairman of the board during the later years of his life. He was secretary of the Alumni Association from 1904, having served as president in 1891-1892.

In 1920 he was honored with the presidency of Pennsylvania Pharmaceutical Association. In 1910, he was elected to the Committee of Revision of the United States Pharmacopoeia and served on three subcommittees. From 1912-1933 he was secretary of the Philadelphia Drug Exchange.

In 1901, Mr England was elected secretary of the Section on Scientific Papers A. P. A. In 1905, secretary of the Section on Education and Legislation and in 1907 its chairman. From 1909-1920, he was secretary of the Council, served as acting editor of the *Bulletin*, 1910-1911, and was active in establishing the *JOURNAL OF THE A. P. A.*, chairman of the committee on publications until 1920. He served on the Committee of Revision of the National Formulary for many years. He took an active part in the organization of the Philadelphia Branch, A. P. A., and served as its president in 1921-1922. In 1903, his *Alma Mater* conferred on him the degree of Master in Pharmacy, in 1904, he was elected member of the American Medical Association.

The deceased gave many years of faithful and diligent service to the AMERICAN PHARMACEUTICAL ASSOCIATION and to the advancement of American pharmacy.

His wife Mrs Ella Virginia England, and a daughter, Elizabeth Russell England, survive. The obsequies, on December 5th, were largely attended by members of the pharmaceutical and medical professions and of the drug-trade activities.

#### JOSEPH L. MAYER

Joseph L. Mayer, chief chemist of the Louis K. Liggett Co. for more than 20 years, and head of the Chemistry Department of the Brooklyn College of Pharmacy died suddenly December 1st of a heart attack at the age of fifty eight.

Professor Mayer began work as a pharmacist as a drug clerk and was later chief chemist for the Hegeman Co. and the Riker Hegeman Co. For thirty five years he was connected with the Brooklyn College of Pharmacy, as instructor and professor of analytical chemistry. Doctor Mayer was the author of many scientific articles and had served as a member of the board of examiners of the New York Health Department. He was a member of the American Chemical Society and of the AMERICAN PHARMACEUTICAL ASSOCIATION, since 1905.

#### JAMES A. YATES

James Anderson Yates, head of the Department of Chemistry and Physics of the Kansas State Teachers College, Pittsburg, Kans., died November 12, 1933. Doctor Yates was born in Laurel County, Ky. on October 24, 1865. He was in charge of science work at Ottawa University, Ottawa, Kans. from 1897 to 1907 when he took charge of a similar department at Pittsburg, and continued there until the time of his death. He received the degrees of B. S., M. S. and Ph. D., from the University of Kentucky.

Doctor Yates had been a member of the American Chemical Society and of the AMERICAN PHARMACEUTICAL ASSOCIATION, since 1923.

#### ROBERT SIMPSON

We are advised of the death of Robert Simpson, pharmacist, at 201 North 36th St., Philadelphia, where he located soon after his graduation from the Philadelphia College of Pharmacy, in 1883. He had been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION, since 1913.

Moses Kahn, for more than forty years engaged in the retail drug business and one of the most prominent members of the profession in Baltimore, died November 26th at his home in the Esplanade Apartments, of heart trouble. He was seventy four years old and retired about four years ago, at which time his place at Liberty and Lexington streets was taken over by the Read Drug and Chemical Company. Mr Kahn was a member of the Maryland Pharmaceutical Association and of the Baltimore Veteran Druggists Association, and aided in the promulgation of all movements designed to advance the interests as well as raise the ethics of the profession. His wife and a son survive.

## BOOK NOTICES AND REVIEWS.

*Erkennung Organischer Verbindungen in besondern von Arzneimitteln* (Recognition of Organic Compounds, in Particular of Medicinal Agents) by DR LAD EKKERT, Leiter des Pharmaceutisch - Chemischen Laboratoriums im I Chemischen Institute der Koniglich Ungarischen Petrus Pazmany Universitat zu Budapest Verlag von Ferdinand Enke in Stuttgart 1933 184 pages, price in paper cover, Rm 16 00 price bound, Rm 17 60

This book comprises Vol 32 of the extended work, *Die Chemische Analyse* established by the late Dr B M Margosches and now edited by Dr Wilhelm Bottger. The contents of the book consist of descriptions of and qualitative tests for the detection and identification of 191 organic chemicals used as medicinal agents. These substances are arranged alphabetically according to their German names and are treated in monographic style. Under each chemical there is given information concerning its description and properties, such as color taste, crystalline form, melting point boiling point, optical rotation, solubilities, etc., and numerous qualitative tests. The limited size of the book made necessary a selection of the tests to be included. Many common or frequently recurring tests are referred to by their author's names. Citations of the original literature are given throughout the work. Some concept of the nature and diversity of the materials considered and out of the number of tests and literature citations may be obtainable from the following items selected as representative: Apomorphine, 7 tests, 9 references, Cholesterin Ergosterin and Phytosterin 20 tests, 15 references, Gallic Acid, 9 tests, 10 references, Novocaine 7 tests, 9 references, Phenylidimethylpyrazolon 7 tests 11 references, Glucose 11 tests, 31 references, g strophanthin, 4 tests 7 references, Novatropine 8 tests 2 references. In each of the tests, sufficient procedure is given for their performance and in many of them the limit of sensitivity is indicated. Many of the tests presented were developed by the Author in the course of a number of years of work on the revision of the chemical monographs for the Hungarian Pharmacopœia III. Many other well known tests as well as new tests reported in the journals have been studied and improved.

The book should be a valuable reference work for all who are engaged in the revision of the organic chemical monographs for the United

States Pharmacopœia and National Formulary. It should also be of value in all laboratories where the detection and identification of organic medicinal agents are studied.—GLENN L JENKINS

*Proceedings of the National Conference on Pharmaceutical Research*. This publication of 100 pages records Pharmaceutical Research achievements in the profession of pharmacy, also contains the minutes of the meeting in Madison, August 26, 1933. The reports of the Standing Committees on Dispensing, Manufacturing, Medicinal, Chemical, Pharmacognosy Pharmacology and Bioassays, Bacteriology and Biology, Physical Chemistry, Educational Methods, Pharmaceutical Economics, and Historical Pharmacy give useful data for pharmacists.

Table No 1 lists reports of pharmaceutical research in laboratories and Table No 2 that of specific scientific research, together with names of contributors and authors. The titles are indicative of the valuable information contained in this publication and serve as a reference to many subjects, the matter is well arranged and the printing commends the author and compiler. The secretary of the National Conference on Pharmaceutical Research is Dr John C Krantz, Jr, 2411 N Charles St, Baltimore, Md.

Dean, F J Wulling gave to the museum of the University of Minnesota the prescription balance and microscope he won as prizes for scholarship when he graduated from the Columbia University College of Pharmacy in 1887. He donated also the student lamp used by him in his student days.

The Minnesota State Pharmaceutical Association celebrates its Golden Anniversary, February 13th-16th. The celebration will be in the nature of a homecoming for national figures whose earlier training was secured under association auspices—Dr E L Newcomb secretary and executive vice president of the National Wholesale Druggists' Association, and John W Dargavel, secretary of the National Association of Retail Druggists, will be among the speakers.

Tuesday evening November 28th, approximately 300 friends of John W Dargavel, recently elected secretary of the N A R D, gave a dinner in his honor at the Hotel Nicollet, Minneapolis.